THE MONIST

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Devoted to the Philosophy of Science

CONTENTS:

THE MONIST

ISSUES OF PRAGMATICISM.

PRAGMATICISM was originally enounced[1] in the form of a maxim, as follows: Consider what effects that might *conceivably* have practical bearings you *conceive* the objects of your *conception* to have.   Then, your *conception* of those effects is the whole of your *conception* of the object.

I will restate this in other words, since ofttimes one can thus eliminate some unsuspected source of perplexity to the reader. This time it shall be in the indicative mood, as follows: The entire intellectual purport of any symbol consists in the total of all general modes of rational conduct which, conditionally upon all the possible different circumstances and desires, would ensue upon the acceptance of the symbol.

Two doctrines that were defended by the writer about nine years before the formulation of pragmaticism may be treated as consequences of the latter belief.   One of these may be called Critical Common-sensism.   It is a variety of the Philosophy of Common Sense, but is marked by six distinctive characters, which had better be enumerated at once.

Character I.   Critical Common-sensism admits that there not only are indubitable propositions but also that there are indubitable inferences.   In one sense, anything evident is indubitable; but the propositions and inferences which Critical Common-Sensism holds to be original, in the sense one cannot "go behind" them (as the

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[1] *Popular Science Monthly*, XII, 293; for Jan. 1878.   An introductory article opens the volume, in the number for Nov., 1877.

lawyers say) are indubitable in the sense of being acritical. The term "reasoning" ought to be confined to such fixation of one belief by another as is reasonable, deliberate, self-controlled. A reasoning must be conscious; and this consciousness is not mere "immediate consciousness," which (as I argued in 1868, *J. Spec. Phil.*, Vol. II) is simple Feeling viewed from another side, but is in its ultimate nature (meaning in that characteristic element of it that is not reducible to anything simpler), a sense of taking a habit, or disposition to respond to a given kind of stimulus in a given kind of way. As to the nature of that, some *éclaircissements* will appear below and again in my third paper, on the Basis of Pragmaticism. But the secret of rational consciousness is not so much to be sought in the study of this one peculiar nucleolus, as in the review of the process of self-control in its entirety. The machinery of logical self-control works on the same plan as does moral self-control, in multiform detail. The greatest difference, perhaps, is that the latter serves to inhibit mad puttings forth of energy, while the former most characteristically insures us against the quandary of Buridan's ass. The formation of habits under imaginary action (see the paper of Jan., 1878, p. 290 at the top) is one of the most essential ingredients of both; but in the logical process the imagination takes far wider flights, proportioned to the generality of the field of inquiry, being bounded in pure mathematics solely by the limits of its own powers, while in the moral process we consider only situations that may be apprehended or anticipated. For in moral life we are chiefly solicitous about our conduct and its inner springs, and the approval of conscience, while in intellectual life there is a tendency to value existence as the vehicle of forms. Certain obvious features of the phenomena of self-control (and especially of habit), can be expressed compactly and without any hypothetical addition, except what we distinctly rate as imagery, by saying that we have an occult nature of which and of its contents we can only judge by the conduct that it determines, and by phenomena of that conduct. All will assent to that (or all but the extreme nominalist), but anti-synechistic thinkers wind themselves up in a facticious snarl by falsifying the phenomena in representing con-

sciousness to be, as it were, a skin, a separate tissue, overlying an unconscious region of the occult nature, mind, soul, or physiological basis. It appears to me that in the present state of our knowledge a sound methodeutic prescribes that, in adhesion to the appearances, the difference is only relative and the demarcation not precise.

According to the maxim of Pragmaticism, to say that determination affects our occult nature is to say that it is capable of affecting deliberate conduct; and since we are conscious of what we do deliberately, we are conscious *habitualiter* of whatever hides in the depths of our nature; and it is presumable (and *only* presumable,[2] although curious instances are on record), that a sufficiently energetic effort of attention would bring it out. Consequently, to say that an operation of the mind is controlled is to say that it is, in a special sense, a conscious operation; and this no doubt is the consciousness of reasoning. For this theory requires that in reasoning we should be conscious, not only of the conclusion, and of our deliberate approval of it, but also of its being the result of the premiss from which it does result, and furthermore that the inference is one of a possible class of inferences which conform to one guiding principle. Now in fact we find a well-marked class of mental operations, clearly of a different nature from any others which do possess just these properties. They alone deserve to be called *reasonings;* and if the reasoner is conscious, even vaguely, of what his guiding principle is, his reasoning should be called a *logical argumentation.* There are, however, cases in which we are conscious that a belief has been determined by another given belief, but are not conscious that it proceeds on any general principle. Such is St. Augustine's *"cogito, ergo sum."* Such a process should be called, *(immediate?)* not a reasoning but an *acritical inference.* Again, there are cases in which one belief is determined by another, without our being at all aware of it. These should be called *associational suggestions of belief.*

Now the theory of Pragmaticism was originally based, as anybody will see who examines the papers of Nov. 1877 and Jan. 1878,

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[2] But see the experiments of J. Jastrow and me "On Slight Differences of Sensation" in the *Memoirs of the National Academy of Sciences.* Vol. III.

mature's un-genetic

upon a study of that experience of the phenomena of self-control which is common to all <u>grown men and women</u>; and it seems evident that to some extent, at least, it must always be so based. For it is to conceptions of deliberate conduct that Pragmaticism would trace the intellectual purport of symbols; and deliberate conduct is self-controlled conduct. Now control may itself be controlled, criticism itself subjected to criticism; and ideally there is no obvious definite limit to the sequence. But if one seriously inquires whether it is possible that a completed series of actual efforts should have been endless or beginningless, (I will spare the reader the discussion), I think he can only conclude that (with some vagueness as to what constitutes an effort) this must be regarded as impossible.

Invariances

It will be found to follow that there are, besides perceptual judgments, original (i. e. indubitable because uncriticized) beliefs of a general and recurrent kind, as well as indubitable acritical inferences.

It is important for the reader to satisfy himself that genuine doubt always has an external origin, usually from surprise; and that it is as impossible for a man to create in himself a genuine doubt by such an act of the will as would suffice to imagine the condition of a mathematical theorem, as it would be for him to give himself a genuine surprise by a simple act of the will.

I beg my reader also to believe that it would be impossible for me to put into these articles over two per cent. of the pertinent thought which would be necessary in order to present the subject as I have worked it out. I can only make a small selection of what it seems most desirable to submit to his judgment. Not only must all steps be omitted which he can be expected to supply for himself, but unfortunately much more that may cause him difficulty.

Character II. I do not remember that any of the old Scotch philosophers ever undertook to draw up a complete list of the original beliefs, but they certainly thought it a feasible thing, and that the list would hold good for the minds of all men from Adam down. For in those days Adam was an undoubted historical personage. Before any waft of the air of evolution had reached those coasts how could they think otherwise? When I first wrote, we were hardly orientated in the new ideas, and my impression was that the indubitable propo-

sitions changed with a thinking man from year to year. I made some studies preparatory to an investigation of the rapidity of these changes, but the matter was neglected, and it has been only during the last two years that I have completed a provisional inquiry which shows me that the changes are so slight from generation to generation, though not imperceptible even in that short period, that I thought to own my adhesion, under inevitable modification, to the opinion of that subtle but well-balanced intellect, Thomas Reid, in the matter of Common Sense (as well as in regard to immediate perception, along with Kant).[2]

Character III. The Scotch philosophers recognized that the original beliefs, and the same thing is at least equally true of the acritical inferences, were of the general nature of instincts. But little as we know about instincts, even now, we are much better acquainted with them than were the men of the XVIIIth century. We know, for example, that they can be somewhat modified in a very short time. The great facts have always been known; such as that instinct seldom errs, while reason goes wrong nearly half the time, if not more frequently. But one thing the Scotch failed to recognize is that the original beliefs only remain indubitable in their application to affairs that resemble those of a primitive mode of life. It is, for example, quite open to reasonable doubt whether the motions of electrons are confined to three dimensions, although it is good methodeutic to presume that they are until some evidence to the contrary is forthcoming. On the other hand, as soon as we find that a belief shows symptoms of being instinctive, although it may seem to be dubitable, we must suspect that experiment would show that it is not really so; for in our artificial life, especially in that of a student, no mistake is more likely than that of taking a paper-doubt for the genuine metal. Take, for example, the belief in the criminality of incest. Biology will doubtless testify that the practice is unadvisable; but surely nothing that it has to say could

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[2] I wish I might hope, after finishing some more difficult work, to be able to resume this study and to go to the bottom of the subject, which needs the qualities of age and does not call upon the powers of youth. A great range of reading is necessary; for it is the belief men *betray* and not that which they *parade* which has to be studied.

warrant the intensity of our sentiment about it. When, however, we consider the thrill of horror which the idea excites in us, we find reason in that to consider it to be an instinct; and from that we may infer that if some rationalistic brother and sister were to marry, they would find that the conviction of horrible guilt could not be shaken off.

In contrast to this may be placed the belief that suicide is to be classed as murder. There are two pretty sure signs that this is not an instinctive belief. One is that it is substantially confined to the Christian world. The other is that when it comes to the point of actual self-debate, this belief seems to be completely ex-punged and ex-sponged from the mind. In reply to these powerful arguments, the main points urged are the authority of the fathers of the church and the undoubtedly intense instinctive clinging to life. The latter phenomenon is, however, entirely irrelevant. For though it is a wrench to part with life, which has its charms at the very worst, just as it is to part with a tooth, yet there is no *moral* element in it whatever. As to the Christian tradition, it may be explained by the circumstances of the early Church. For Christianity, the most terribly earnest and most intolerant of religions,— [See *The Book of Revelations of St. John the Divine,*]—and it remained so until diluted with civilization,—recognized no morality as worthy of an instant's consideration except Christian morality. Now the early Church had need of martyrs, i. e., witnesses, and if any man had done with life, it was abominable infidelity to leave it otherwise than as a witness to its power. This belief, then, should be set down as dubitable; and it will no sooner have been pronounced dubitable, than Reason will stamp it as false.

The Scotch School appear to have no such distinction, concerning the limitations of indubitability and the consequent limitations of the jurisdiction of original belief.

Character IV. By all odds, the most distinctive character of the Critical Common-sensist, in contrast to the old Scotch philosopher, lies in his insistence that the acritically indubitable is invariably vague.

Logicians have been at fault in giving Vagueness the go-by,

Martyrdom = self-murder

so far as not even to analyze it. The present writer has done his
best to work out the Stechiology (or Stoicheiology), Critic, and
Methodeutic of the subject, but can here only give a definition or
two with some proposals respecting terminology.

Accurate writers have apparently made a distinction between
the *definite* and the *determinate*. A subject is *determinate* in re-
spect to any character which inheres in it or is (universally and
affirmatively) predicated of it, as well as in respect to the negative
of such character, these being the very same respect. In all other
respects it is *indeterminate*. The *definite* shall be defined presently.
A sign (under which designation I place every kind of thought, and
not alone external signs,) that is in any respect objectively indeter-
minate (i. e. whose object is undetermined by the sign itself) is
objectively *general* in so far as it extends to the interpreter the
privilege of carrying its determination further.[4] *Example*: "Man is
mortal." To the question, What man? the reply is that the propo-
sition explicitly leaves it to you to apply its assertion to what man
or men you will. A sign that is objectively indeterminate in any
respect is objectively *vague* in so far as it reserves further determi-
nation to be made in some other conceivable sign, or at least does
not appoint the interpreter as its deputy in this office. *Example*:
"A man whom I could mention seems to be a little conceited." The
suggestion here is that the man in view is the person addressed;
but the utterer does not authorize such an interpretation or *any*
other application of what she says. She can still say, if she likes,
that she does *not* mean the person addressed. Every utterance
naturally leaves the right of further exposition in the utterer; and

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[4] Hamilton and a few other logicians understood the subject of a universal
proposition in the collective sense; but every person who is well-read in logic
is familiar with many passages in which the leading logicians explain with an
iteration that would be superfluous if all readers were intelligent, that such a
subject is distributively not collectively general. A term denoting a collection
is singular, and such a term is an "abstraction" or product of the operation of
hypostatic abstraction as truly as is the name of the essence. "Mankind" is
quite as much an abstraction and *ens rationis* as is "humanity." Indeed, every
object of a conception is either a signate individual or some kind of indeter-
minate individual. Nouns in the plural are usually distributive and general;
common nouns in the singular are usually indefinite.

therefore, in so far as a sign is indeterminate, it is vague, unless it is expressly or by a well-understood convention rendered general. Usually, an affirmative predication covers *generally* every essential character of the predicate, while a negative predication *vaguely* denies some essential character. In another sense, honest people, when not joking, intend to make the meaning of their words determinate, so that there shall be no latitude of interpretation at all. That is to say, the character of their meaning consists in the implications and non-implications of their words; and they intend to fix what is implied and what is not implied. They believe that they succeed in doing so, and if their chat is about the theory of numbers, perhaps they may. But the further their topics are from such presciss, or "abstract," subjects, the less possibility is there of such precision of speech. In so far as the implication is not determinate, it is usually left vague; but there are cases where an unwillingness to dwell on disagreeable subjects causes the utterer to leave the determination of the implication to the interpreter; as if one says, "That creature is filthy, in every sense of the term."

Perhaps a more scientific pair of definitions would be that anything is *general* in so far as the principle of excluded middle does not apply to it and is *vague* in so far as the principle of contradiction does not apply to it. Thus, although it is true that "Any proposition you please, *once you have determined its identity*, is either true or false"; yet *so long as it remains indeterminate and so without identity*, it need neither be true that any proposition you please is true, nor that any proposition you please is false. So likewise, while it is false that "A proposition *whose identity I have determined* is both true and false," yet until it is determinate, it may be true that a proposition is true and that a propostion is false.

In those respects in which a sign is not vague, it is said to be *definite,* and also with a slightly different mode of application, to be *precise,* a meaning probably due to *præcisus* having been applied to curt denials and refusals. It has been the well-established, ordinary sense of *precise* since the Plantagenets; and it were much to be desired that this word, with its derivatives *precision, precisive,* etc., should, in the dialect of philosophy, be restricted to this sense.

To express the act of *rendering precise* (though usually only in reference to numbers, dates, and the like,) the French have the verb *préciser*, which, after the analogy of *décider*, should have been *précider*. Would it not be a useful addition to our English terminology of logic, to adopt the verb *to precide*, to express the general sense, to render precise? Our older logicians with salutary boldness seem to have created for their service the verb *to prescind*, the corresponding Latin word meaning only to "cut off at the end," while the English word means to suppose without supposing some more or less determinately indicated accompaniment. In geometry, for example, we "prescind" shape from color, which is precisely the same thing as to "abstract" color from shape, although very many writers employ the verb "to abstract" so as to make it the equivalent of "prescind." But whether it was the invention or the courage of our philosophical ancestors which exhausted itself in the manufacture of the verb "prescind," the curious fact is that instead of forming from it the noun *prescission*, they took pattern from the French logicians in putting the word *precision* to this second use. About the same time[5] [See Watts. *Logick*, 1725, I, vi, 9 *ad fin.*] the adjective *precisive* was introduced to signify what *prescissive* would have more unmistakably conveyed. If we desire to rescue the good ship Philosophy for the service of Science from the hands of lawless rovers of the sea of literature, we shall do well to keep prescind, presciss, prescission, and prescissive on the one hand, to refer to dissection in hypothesis, while precide, precise, precision, and precisive are used so as to refer exclusively to an expression of determination which is made either full or free for the interpreter. We shall thus do much to relieve the stem "abstract" from staggering under the double burden of conveying the idea of prescission as well as the unrelated and very important idea of the creation of *ens rationis* out of an ἔπος πτερόεν,—to filch the phrase to furnish a name for an expression of non-substantive thought,—an opera-

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[5] But unfortunately it has not been in the writer's power to consult the *Oxford Dictionary* concerning these words; so that probably some of the statements in the text might be corrected with the aid of that work.

tion that has been treated as a subject of ridicule,—this hypostatic abstraction,—but which gives mathematics half its power.

The purely formal conception that the three affections of terms, *determination, generality,* and *vagueness* form a group dividing a category of what Kant calls "functions of judgment" will be passed by as unimportant by those who have yet to learn how important a part purely formal conceptions may play in philosophy. Without stopping to discuss this, it may be pointed out that the "quantity" of propositions in logic, that is, the distribution of the *first* subject[e], is either *singular* (that is, determinate, which renders it substantially negligible in formal logic), or *universal* (that is, general), or *particular* (as the mediæval logicians say, that is, vague or *indefinite*). It is a curious fact that in the logic of relations it is the first and last quantifiers of a proposition that are of chief importance. To affirm of anything that it is a horse is to yield to it *every* essential character of a horse: to deny of anything that it is a horse is vaguely to refuse to it *some* one or more of those essential characters of the horse. There are, however, predicates that are unanalyzable in a given state of intelligence and experience. These are, therefore, determinately affirmed or denied. Thus, this same group of concepts reappears. Affirmation and denial are in themselves unaffected by these concepts, but it is to be remarked that there are cases in which we can have an apparently definite idea of a border line between affirmation and negation. Thus, a point of a surface may be in a region of that surface, or out of it, or on its boundary. This gives us an indirect and vague conception of an intermediary between affirmation and denial in general, and consequently of an intermediate, or nascent state, between determination and indetermination. There must be a similar intermediacy between generality and vagueness. Indeed, in an article in the seventh volume of

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[e] Thus returning to the writer's original nomenclature, in despite of *Monist* VII, 209, where an obviously defective argument was regarded as sufficient to determine a mere matter of terminology. But the Quality of propositions is there regarded from a point of view which seems extrinsic. I have not had time, however, to re-explore all the ramifications of this difficult question by the aid of existential graphs, and the statement in the text about the last quantifier may need modification.

The Monist, pp. 205-217, there lies just beneath the surface of what is explicitly said, the idea of an endless series of such *intermediacies.* We shall find below some application for these reflections.

Character V. The Critical Common-sensist will be further distinguished from the old Scotch philosopher by the great value he attaches to doubt, provided only that it be the weighty and noble metal itself, and no counterfeit nor paper substitute. He is not content to ask himself whether he does doubt, but he invents a plan for attaining to doubt, elaborates it in detail, and then puts it into practice, although this may involve a solid month of hard work; and it is only after having gone through such an examination that he will pronounce a belief to be indubitable. Moreover, he fully acknowledges that even then it may be that some of his indubitable beliefs may be proved false.

The Critical Common-sensist holds that there is less danger to *heuretic* heuretic science in believing too little than in believing too much, Yet for all that, the consequences to heuretics of believing too little may be no less than disaster.

Character VI. Critical Common-sensism may fairly lay claim to this title for two sorts of reasons; namely, that on the one hand it subjects four opinions to rigid criticism: its own; that of the Scotch school; that of those who would base logic or metaphysics on psychology or any other special science, the least tenable of all the philosophical opinions that have any vogue; and that of Kant; while on the other hand it has besides some claim to be called Critical from the fact that it is but a modification of Kantism. The *Successive steps* present writer was a pure Kantist until he was forced by successive steps into Pragmaticism. The Kantist has only to abjure from the bottom of his heart the proposition that a thing-in- itself can, however indirectly, be conceived; and then correct the details of Kant's doctrine accordingly, and he will find himself to have become a Critical Common-sensist.

Another doctrine which is involved in Pragmaticism as an essential consequence of it, but which the writer defended (*J. Spec. Phil.,* Vol. II, p. 155 *ad fin.* 1868, and *N. Am. Rev.,* Vol. CXIII, pp. 449-472, 1871), before he had formulated, even in his own

mind, the principle of pragmaticism, is the scholastic doctrine of realism. This is usually defined as the opinion that there are real objects that are general, among the number being the modes of determination of existent singulars, if, indeed, these be not the only such objects. But the belief in this can hardly escape being accompanied by the acknowledgment that there are, besides, real *vagues*, and especially real possibilities. For possibility being the denial of a necessity, which is a kind of generality, is vague like any other contradiction of a general. Indeed, it is the reality of some possibilities that pragmaticism is most concerned to insist upon. The article of Jan. 1878 endeavored to gloze over this point as unsuited to the exoteric public addressed; or perhaps the writer wavered in his own mind. He said that if a diamond were to be formed in a bed of cotton-wool, and were to be consumed there without ever having been pressed upon by any hard edge or point, it would be merely a question of nomenclature whether that diamond should be said to have been hard or not. No doubt, this is true, except for the abominable falsehood in the word MERELY, implying that symbols are unreal. Nomenclature involves classification; and classification is true or false, and the generals to which it refers are either reals in the one case, or figments in the other. For if the reader will turn to the original maxim of pragmaticism at the beginning of this article, he will see that the question is, not what *did* happen, but whether it would have been well to engage in any line of conduct whose successful issue depended upon whether that diamond *would* resist an attempt to scratch it, or whether all other logical means of determining how it ought to be classed *would* lead to the conclusion which, to quote the very words of that article, would be "the belief which alone could be the result of investigation carried *sufficiently far.*" Pragmaticism makes the ultimate intellectual purport of what you please to consist in conceived conditional resolutions, or their substance; and therefore, the conditional propositions, with their hypothetical antecedents, in which such resolutions consist, being of the ultimate nature of meaning, must be capable of being true, that is, of expressing whatever there be which is such as the proposition expresses, independently of being

thought to be so in any judgment, or being represented to be so in any other symbol of any man or men. But that amounts to saying that possibility is sometimes of a real kind.

Fully to understand this, it will be needful to analyze modality, and ascertain in what it consists. In the simplest case, the most subjective meaning, if a person does not know that a proposition is false, he calls it *possible*. If, however, he knows that it is *true*, it is much more than possible. Restricting the word to its characteristic applicability, a state of things has the Modality of the possible, —that is, of the merely possible,—only in case the contradictory state of things is likewise possible, which proves possibility to be the vague modality. One who knows that Harvard University has an office in State Street, Boston, and has impression that it is at No. 30, but yet suspects that 50 is the number, would say "I think it is at No. 30, but it *may be* at No. 50," or "it *is possibly* at No. 50." Thereupon, another, who does not doubt his recollection, might chime in, "It *actually is* at No. 50," or simply "it *is* at No. 50," or " it *is* at No. 50, *de inesse.*" Thereupon, the person who had first asked, what the number was might say, "Since you are so positive, it *must be* at No. 50," for "I know the first figure is 5. So, since you are both certain the second is a o, why 50 it *necessarily is.*" That is to say, in this most subjective kind of Modality, that which is known by direct recollection is in the Mode of *Actuality,* the determinate mode. But when knowledge is indeterminate among alternatives, either there is one state of things which alone accords with them all, when this is in the Mode of *Necessity,* or there is more than one state of things that no knowledge excludes, when each of these is in the Mode of *Possibility.*

Other kinds of subjective Modality refer to a Sign or Representamen which is assumed to be true, but which does not include the Utterer's (i. e. the speaker's, writer's, thinker's or other symbolizer's) total knowledge, the different Modes being distinguished very much as above. There are other cases, however, in which, justifiably or not, we certainly think of Modality as objective. A man says, "I *can* go to the seashore if I like." Here is implied, to be sure, his ignorance of how he will decide to act. But this is not

the point of the assertion. It is that the complete determination of conduct in the *act* not yet having taken place, the further determination of it belongs to the subject of the action regardless of external circumstances. If he had said, "I *must* go where my employers may send me," it would imply that the function of such further determination lay elsewhere. In "You *may* do so and so," and "You *must* do so," the "may" has the same force as "can," except that in the one case freedom from particular circumstances is in question, and in the other freedom from a law or edict. Hence the phrase, "You *may* if you *can*." I must say that it is difficult for me to preserve my respect for the competence of a philosopher whose dull logic, not penetrating beneath the surface, leaves him to regard such phrases as misrepresentations of the truth. So an act of hypostatic abstraction which in itself is no violation of logic, however it may lend itself to a dress of superstition, may regard the collective tendencies to variableness in the world, under the name of Chance, as at one time having their way, and at another time overcome by the element of order; so that, for example, a superstitious cashier, impressed by a bad dream, may say to himself of a Monday morning, "*May be*, the bank has been robbed." No doubt, he recognizes his total ignorance in the matter. But besides that, he has in mind the absence of any particular cause which should protect his bank more than others that are robbed from time to time. He thinks of the variety in the universe as vaguely analogous to the indecision of a person, and borrows from that analogy the garb of his thought. At the other extreme stand those who declare as inspired, (for they have no rational proof of what they allege), that an actuary's advice to an insurance company is based on nothing at all but ignorance.

There is another example of objective possibility: "A pair of intersecting rays, i. e., unlimited straight lines conceived as movable objects, *can* (or *may*) move, without ceasing to intersect, so that one and the same hyperboloid shall be completely covered by the track of each of them." How shall we interpret this, remembering that the object spoken of, the pair of rays, is a pure creation of the Utterer's imagination, although it is required (and, indeed, forced)

to conform to the laws of space? Some minds will be better satis-
fied with a more subjective, or nominalistic, others with a more
objective, realistic interpretation. But it must be confessed on
all hands that whatever degree or kind of reality belongs to pure
space belongs to the substance of that proposition, which merely
expresses a property of space.

Let us now take up the case of that diamond which, having
been crystallized upon a cushion of jeweler's cotton, was accidentally
consumed by fire before the crystal of corundum that had been
sent for had had time to arrive, and indeed without being subjected
to any other pressure than that of the atmosphere and its own weight.
The question is, was that diamond *really* hard? It is certain that
no discernible *actual* fact determined it to be so. But is its hardness
not, nevertheless, a *real* fact? To say, as the article of Jan. 1878
seems to intend, that it is just as an arbitrary "usage of speech"
chooses to arrange its thoughts, is as much as to decide against
the reality of the property, since the real is that which is such as
it is regardless of how it is, at any time, thought to be. Remember
that this diamond's condition is not an isolated fact. There is no
such thing; and an isolated fact could hardly be real. It is an un-
severed, though presciss part of the unitary fact of nature. Being
a diamond, it was a mass of pure carbon, in the form of a more or
less transparent crystal, (brittle, and of facile octahedral cleavage,
unless it was of an unheard of variety), which, if not trimmed after
one of the fashions in which diamonds may be trimmed, took the
shape of an octahedron, apparently regular (I need not go into
minutiæ), with grooved edges, and probably with some curved
faces. Without being subjected to any considerable pressure, it
could be found to be insoluble, very highly refractive, showing under
radium rays (and perhaps under "dark light" and X-rays) a pecu-
liar bluish phosphorescence, having as high a specific gravity as
realgar or orpiment, and giving off during its combustion less heat
than any other form of carbon would have done. From some of
these properties hardness is believed to be inseparable. For like it
they bespeak the high polemerization of the molecule. But how-
ever this may be, how can the hardness of all other diamonds fail

i. e., functioning in a context [margin note]

to bespeak *some* real relation among the diamonds without which a piece of carbon would not be a diamond? Is it not a monstrous perversion of the word and concept *real* to say that the accident of the non-arrival of the corundum prevented the hardness of the diamond from having the *reality* which it otherwise, with little doubt, would have had?

At the same time, we must dismiss the idea that the occult state of things (be it a relation among atoms or something else), which constitutes the reality of a diamond's hardness can possibly consist in anything but in the truth of a general conditional proposition. For to what else does the entire teaching of chemistry relate except to the "behavior" of different possible kinds of material substance? And in what does that behavior consist except that if a substance of a certain kind should be exposed to an agency of a certain kind, a certain kind of sensible result *would* ensue, according to our experiences hitherto. As for the pragmaticist, it is precisely his position that nothing else than this can be so much as *meant* by saying that an object possesses a character. He is therefore obliged to subscribe to the doctrine of a real Modality, including real Necessity and real Possibility.

A good question, for the purpose of illustrating the nature of Pragmaticism, is, What is Time? It is not proposed to attack those most difficult problems connected with the psychology, the epistemology, or the metaphysics of Time, although it will be taken for granted, as it must be according to what has been said, that Time is real. The reader is only invited to the humbler question of what we mean by Time, and not of every kind of meaning attached to Past, Present, and Future either. Certain peculiar feelings are associated with the three general determinations of Time; but those are to be sedulously put out of view. That the reference of events to Time is irresistible will be recognized; but as to how it may differ from other kinds of irresistibility is a question not here to be considered. The question to be considered is simply, What is the intellectual purport of the Past, Present, and Future? It can only be treated with the utmost brevity.

That Time is a particular variety of objective Modality is too

obvious for argumentation. The Past consists of the sum of *faits accomplis,* and this Accomplishment is the Existential Mode of Time. For the Past really acts upon us, and *that* it does, not at all in the way in which a Law or Principle influences us, but precisely as an Existent object acts. For instance, when a *Nova Stella* bursts out in the heavens, it acts upon one's eyes just as a light struck in the dark by one's own hands would; and yet it is an event which happened before the Pyramids were built. A neophyte may remark that its reaching the eyes, which is all we know, happens but a fraction of a second before we know it. But a moment's consideration will show him that he is losing sight of the question, which is not whether the distant Past can act upon us *immediately,* but whether it acts upon us just as any Existent does. The instance adduced (certainly a commonplace enough fact), proves conclusively that the mode of the Past is that of Actuality. Nothing of the sort is true of the Future, to compass the understanding of which it is indispensable that the reader should divest himself of his Necessitarianism,—at best, but a scientific theory,—and return to the Common-sense State of Nature. Do you never say to yourself, "I *can* do this or that as well to-morrow as to-day"? Your Necessitarianism is a theoretical pseudo-belief,—a make-believe belief,—that such a sentence does not express the real truth. That is only to stick to proclaiming the unreality of that Time, of which you are invited, be it reality or figment, to consider the meaning. You need not fear to compromise your darling theory by looking out at its windows. Be it true in theory or not, the unsophisticated conception is that everything in the Future is either *destined,* i. e. necessitated already, or is *undecided,* the contingent future of Aristotle. In other words, it is not Actual, since it does not act except through the idea of it, that is, as a law acts; but is either Necessary or Possible, which are of the same mode since (as remarked above) Negation being outside the category of modality cannot produce a variation in Modality. As for the Present instant, it is so inscrutable that I wonder whether no sceptic has ever attacked its reality. I can fancy one of them dipping his pen in his blackest ink to commence the assault, and then suddenly reflecting that his entire life

is in the Present,—the "living present," as we say, this instant
when all hopes and fears concerning it come to their end, this Living
Death in which we are born anew. It is plainly that Nascent State
between the Determinate ànd the Indeterminate that was noticed
above.

Pragmaticism consists in holding that the purport of any concept
is its conceived bearing upon our conduct. How, then, does the
Past bear upon conduct? The answer is self-evident: whenever
we set out to do anything, we "go upon," we base our conduct on facts
already known, and for these we can only draw upon our memory.
It is true that we may institute a new investigation for the purpose;
but its discoveries will only become applicable to conduct after
they have been made and reduced to a memorial maxim. In short,
the Past is the store-house of all our knowledge.

When we say that we know that some state of things exists,
we mean that it used to exist, whether just long enough for the
news to reach the brain and be retransmitted to tongue or pen, or
longer ago. Thus, from whatever point of view we contemplate
the Past, it appears as the Existential Mode of Time.

How does the Future bear upon conduct? The answer is that
future facts are the only facts that we can, in a measure, control;
and whatever there may be in the Future that is not amenable to
control are the things that we *shall* be able to infer, or *should* be
able to infer under favorable circumstances. There may be ques-
tions concerning which the pedulum of opinion never would cease
to oscillate, however favorable circumstances may be. But if so,
those questions are *ipso facto* not *real* questions, that is to say, are
questions to which there is no true answer to be given. It is natural
to use the future tense (and the conditional mood is but a mollified
future) in drawing a conclusion or in stating a consequence. "If
two unlimited straight lines in one plane and crossed by a third
making the sum ... then these straight lines *will* meet on the side,
etc." It cannot be denied that acritical inferences may refer to
the Past in its capacity as past; but according to Pragmaticism, the
conclusion of a Reasoning power must refer to the Future. For its
meaning refers to conduct, and since it is a reasoned conclusion

must refer to deliberate conduct, which is controllable conduct. But the only controllable conduct is Future conduct. As for that part of the Past that lies beyond memory, the Pragmaticist doctrine is that the meaning of its being believed to be in connection with the Past consists in the acceptance as truth of the conception that we ought to conduct ourselves according to it (like the meaning of any other belief). Thus, a belief that Christopher Columbus discovered America really refers to the future. It is more difficult, it must be confessed, to account for beliefs that rest upon the double evidence of feeble but direct memory and upon rational inference. The difficulty does not seem insuperable; but it must be passed by.

What is the bearing of the Present instant upon conduct?

Introspection is wholly a matter of inference. One is immediately conscious of his Feelings, no doubt; but not that they are feelings of an *ego*. The *self* is only inferred. There is no time in the Present for any inference at all, least of all for inference concerning that very instant. Consequently the present object must be an external object, if there be any objective reference in it. The attitude of the Present is either conative or perceptive. Supposing it to be perceptive, the perception must be immediately known as external,—not indeed in the sense in which a hallucination is *not* external, but in the sense of being present regardless of the perceiver's will or wish. Now this kind of externality is conative externality. Consequently, the attitude of the present instant (according to the testimony of Common Sense, which is plainly adopted throughout) can only be a Conative attitude. The consciousness of the present is then that of a struggle over what shall be; and thus we emerge from the study with a confirmed belief that it is the Nascent State of the Actual.

But how is Temporal Modality distinguished from other Objective Modality? Not by any general character since Time is unique and *sui generis*. In other words there is only one Time. Sufficient attention has hardly been called to the surpassing truth of this for Time as compared with its truth for Space. Time, therefore, can only be identified by brute compulsion. But we must not go further.

MILFORD. PA. CHARLES S. PEIRCE.

CHINESE OCCULTISM.

BELIEF in mysterious agencies characterises a certain period in the religious development of every nation. Even the Jews, distinguished among the Semites by their soberness, consulted Yahveh through the Urim and Thummim, an oracle the nature of which is no longer definitely known. Kindred institutions among most nations are based upon primitive animism, or a belief in spirits, but in China we have a very peculiar mixture of logical clearness with fanciful superstitions. Chinese occultism is based upon a rational, nay a philosophical, or even mathematical, conception of existence. An original rationalism has here engendered a most luxurious growth of mysticism, and so the influence of occultism upon the people of the Middle Kingdom has been prolonged beyond measure.

THE YIH SYSTEM.

Among the ancient traditions of China there is a unique system of symbols called the *yih* (易), i. e., "permutations" or "changes,"

THE TWO PRIMARY FORMS* (LIANG I).

	THE YANG	THE YIH
Old form	O	●
Modern form	▬▬	▬ ▬

* It is difficult to translate the term *Liang I*. One might call the two *I* "elements," if that word were not used in another sense. The two *I* are commonly referred to as "Elementary Forms" or "Primary Forms." De Groot speaks of them as "Regulators."

which consists of all possible combinations of two elements, called
liang i (兩 儀), i. e., the two elementary forms, which are the nega-
tive principle, *yin* (陰), and the positive principle, *yang* (陽). The
four possible configurations of yang and yin in groups of two are
called *ssu shiang* (四 象), i. e., "the four [secondary] figures"; all
further combinations of the elementary forms into groups of three
or more are called *kwa* (卦). In English, groups of three elementary
forms are commonly called trigrams, and groups of six, hexagrams.

The book in which the permutations of yang and yin are re-
corded, was raised in ancient times to the dignity of a canonical
writing, a class of literature briefly called *king* in Chinese. Hence
the book is known under the title of *Yih King*.

The *Yih King* is one of the most ancient, most curious, and most
mysterious documents in the world. It is more mysterious than the
pyramids of Egypt, more ancient than the Vedas of India, more
curious than the cuneiform inscriptions of Babylon.

In the earliest writings, the yang is generally represented as
a white disk and the yin as a black one; but later on the former is
replaced by one long dash denoting strength, the latter by two short
dashes considered as a broken line to represent weakness. Disks
are still used for diagrams, as in the Map of Ho and the Table of
Loh, but the later method was usually employed, even before Con-
fucius, for picturing kwa combinations.

The trigrams are endowed with symbolical meaning according
to the way in which yin and yang lines are combined. They apply
to all possible relations of life and so their significance varies.

Since olden times, the yih system has been considered a phil-
osophical and religious panacea; it is believed to solve all problems,
to answer all questions, to heal all ills. He who understands the
yih is supposed to possess the key to the riddle of the universe.

The yih is capable of representing all combinations of existence.
The elements of the yih, yang the positive principle and yin the
negative principle, stand for the elements of being. Yang means
"bright," and yin, "dark." Yang is the principle of heaven; yin,
the principle of the earth. Yang is the sun, yin is the moon.
Yang is masculine and active; yin is feminine and passive. The

THE FOUR FIGURES (SSU SHIANG).

SYMBOL	NAME	SIGNIFICANCE						
⚌	Yang Major	Sun	Heat	Mentality (or leadership)	Unity (or origin)	The nature of things (essence)	Eyes	Great Monarch³
⚎	Yang Minor	Fixed Stars	Day-light	Corporality (bodily organism)	Rotation	Compound things¹	Nose	Prince
⚍	Yin Minor	Planets	Night	Materiality (inertia; bodily substance)	Succession	Multiplicity²	Mouth¹	Duke
⚏	Yin Major	Moon	Cold	Sensuality; passion	Quality	Attributes of things	Ears	Emperor

¹ Unity in multiplicity, i. e., the Yang dominating over the Yin.
² Multiplicity in unity, i. e., the Yin dominating over the Yang.
³ While the Yin major denotes dominion in the concrete world of material existence, the Yang major symbolises the superhuman and supernatural, the divine, the extraordinary, such as would be a genius on a throne, a great man in the highest sense of the word.

former is motion; the latter is rest. Yang is strong, rigid, lordlike; yin is mild, pliable, submissive, wifelike. The struggle between, and the different mixture of, these two elementary contrasts, condition all the differences that prevail, the state of the elements, the nature of things, and also the character of the various personalities as well as the destinies of human beings.

The *Yih King* (易 經) is very old, for we find it mentioned as early as the year 1122 B. C., in the official records of the Chou dynasty, where we read that three different recensions of the work

THE EIGHT KWA FIGURES AND THE BINARY SYSTEM.

NAME	TRANSCRIP- TION	MEANINGS OF THE CHINESE WORD*	KWA	BINARY SYSTEM	ARABIC NUMERALS
乾	ch'ien	to come out; to rise, sunrise; vigorous; (present meaning) dry.	☰	111	7
兌	tui	to weigh; to barter; permeable.	☱	110	6
離	li	to separate.	☲	101	5
震	chan	to quake; to thunder.	☳	100	4
巽	sun	peaceful; a stand or pedestal.	☴	011	3
坎	k'an	a pit; to dig a pit.	☵	010	2
艮	kan	a limit; to stop; perverse.	☶	001	1
坤	kw'un	earth; to nourish; yielding.	☷	000	0

*A native student of the Yih system does not connect the usual meaning of the word with the names of the eight Kwas, and we insert here a translation of the character only for the sake of completeness.

were extant, the *Lien Shan,* the *Kwei Ts'ang* and the *Yih of Chou,*[1] of which, however, the last one alone has been preserved.

This *Yih of Chou,* our present *Yih King,* exhibits two arrangements of the kwa figures, of which one is attributed to their origi-

[1] Lien Shan means "mountain range" and by some is supposed to be a *nom de plume* of Shen Nung (i. e. "divine husbandman"), the mythical ruler of ancient China (2737-2697 B. C.), successor to Fuh-Hi. Others identify Lien Shan with Fuh-Hi. Kwei Ts'ang means "reverted hoard" and may have been simply an inversion of the Lien Shan arrangement. Its invention is assigned to the reign of Hwang Ti, "the Yellow Emperor," the third of the three rulers, (2697-2597 B. C.), a kind of a Chinese Numa Pompilius. The Chou redaction of the *Yih,* which is the latest one, is named after the Chou dynasty.

nator, the legendary Fuh-Hi,[2] the other to Wen Wang.[3] Fuh-Hi
is also called Feng,[4] "wind," and Tai Ho,[5] "the great celestial,"
and he lived, according to Chinese records, from 2852 to 2738 B. C.

It speaks well for the mathematical genius of the ancient found-
ers of Chinese civilisation that the original order of the yih, attributed
to Fuh-Hi, corresponds closely to Leibnitz' Binary System of arith-
metic. If we let the yin represent o and the yang, 1, it appears
that the eight trigrams signify the first eight figures from 0-7,
arranged in their proper arithmetical order, and read from below
upward. Leibnitz knew the yih and speaks of it in terms of high

FUH-HI.

appreciation. Indeed it is not impossible that it suggested to him
his idea of a binary system.

While Fuh-Hi's system exhibits a mathematical order, Wen
Wang's is based upon considerations of occultism. It stands to
reason that Fuh-Hi (by which name we understand that school,
or founder of a school, that invented the yih) may not have grasped
the full significance of his symbols in the line of abstract thought
and especially in mathematics, but we must grant that he was a

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[2]伏羲　　[3]文王　　[4]風　　[5]太昊

mathematical genius, if not in fact, certainly potentially. As to further details our information is limited to legends.

The case is different with Wen Wang, for his life is inscribed on the pages of Chinese history and his character is well known.

The personal name of Wen Wang (i. e., the "scholar-king") is Hsi-Peh, which means "Western Chief." He was the Duke of Chou, one of the great vassals of the empire, and lived from 1231 to 1135 B. C. In his time the emperor was Chou-Sin, a degenerate debauché and a tyrant, the last of the Yin dynasty, who oppressed the people by reckless imposition and provoked a just rebellion. Wen Wang offended him and was long kept in prison, but his son

THE TRIGRAMS AS FAMILY RELATIONS.

FATHER	MOTHER
☰	☷

Eldest Son	Second Son	Youngest Son	Eldest Daughter	Second Daughter	Youngest Daughter
☳	☵	☶	☴	☲	☱

Fa, surnamed Wu Wang, being forced into a conflict with Chou-Sin, overthrew the imperial forces. The tyrant died in the flames of his palace which had been ignited by his own hands. Wu Wang[6] assumed the government and became the founder of the Chou dynasty which reigned from 1122 until 225 B. C.

Wen Wang was a man of earnest moral intentions, but with a hankering after occultism. During his imprisonment he occupied himself in his enforced leisure with the symbols of the yih, and found much comfort in the divinations which he believed to discover in them. When he saw better days he considered that the

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[6] Wu Wang was born 1169 B. C.; he became emperor in 1122 B. C. and died 1116 B. C.

prophecies were fulfilled, and his faith in their occult meaning became more and more firmly established.[7]

The eight permutations of the trigrams apparently form the oldest part of the *Yih King*. They have been an object of contemplation since time immemorial and their significance is set forth in various ways. The trigrams consisting of three yang lines are called the unalloyed yang, and of three yin lines, the unalloyed yin. In the mixed groups the place of honor is at the bottom, and if they are conceived as family relations, the unalloyed yang represents
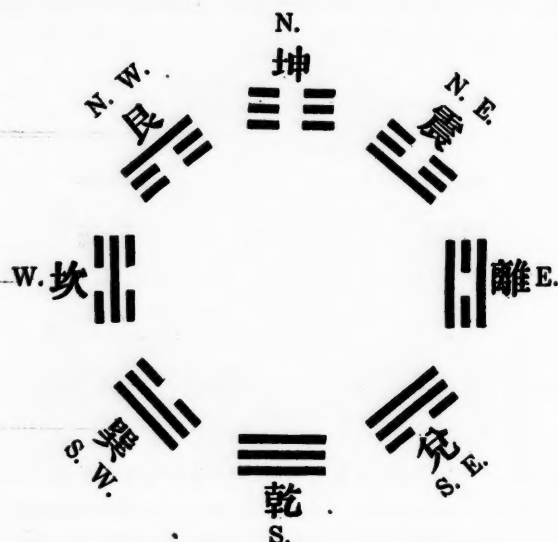
ARRANGEMENT OF TRIGRAMS ACCORDING TO FUH-HI.

the father and the unalloyed yin, the mother. The three sons are represented by the trigrams containing only one yang; the eldest son having yang in the lowest place, the second in the middle, and the third on top. The corresponding trigrams with only one yin line represent in the same way the three daughters.

The trigrams are also arranged both by Fuh-Hi and Wen Wang in the form of a mariner's compass. In the system of Fuh-Hi the

[7] Mayers, *Chinese Reader's Manual*, p. 177.

unalloyed yin stands at the north, the unalloyed yang at the south. The others are so arranged that those which correspond to 1, 2, 3, of Leibnitz' Binary System proceed from north through west to south in regular order, while 4, 5, 6, start from south taking the corresponding places in the east. In this mathematical arrangement we always have the opposed configurations in opposite quarters, so as to have for each place in every opposite kwa a yang line correspond with a yin line and *vice versa;* while if they are expressed

ARRANGEMENT OF TRIGRAMS ACCORDING TO WEN WANG.

in numbers of the binary system, their sums are always equal to seven.

Wen Wang rearranged the trigrams and abandoned entirely the mathematical order attributed to Fuh-Hi. The following quotation from the *Yih King* evinces the occultism which influenced his thoughts:

"All things endowed with life have their origin in chan, as chan corresponds to the east. They are in harmonious existence in siuen because siuen corresponds to the southeast. Li is brightness and renders all things visible

to one another, being the kwa which represents the south. Kw'un is the earth from which all things endowed with life receive food. Tui corresponds to mid-autumn. Ch'ien is the kwa of the northwest. K'an is water, the kwa of of the exact north representing distress, and unto it everything endowed with life reverts. Kan is the kwa of the northeast where living things both rise and terminate."

Since this new arrangement is absolutely dependent on occult considerations, the grouping must appear quite arbitrary from the standpoint of pure mathematics. It is natural that with the growth of mysticism this arbitrariness increases and the original system is lost sight of.

The yin and yang elements are supposed to be the product of a differentiation from the *t'ai chih,* "the grand limit," i. e., the absolute or ultimate reality of all existence, which, containing both yang and yin in potential efficiency, existed in the beginning. The grand limit evolved the pure yang as ether or air, which precipitated the Milky Way, shaping the visible heaven or firmament; while the yin coagulated and sank down to form the earth. But the earth contained enough of the yang to produce heat and life. Some unalloyed yang particles rose to form the sun, while correspondingly other unalloyed yin particles produced the moon, the two great luminaries, which in their turn begot the fixed stars.

THE TABLET OF DESTINY.

At the beginning of Chinese history stands a tablet which in some mysterious way is supposed to be connected with an explanation of the universe. It has been reconstructed by later Chinese thinkers and is pictured in the hands of Fuh-Hi as an arrangement of the kwa figures preserved in the *Yih King.* Considering the several traces of Babylonian traditions in ancient Chinese literature and folklore, would it not be justifiable to identify the tablet of Fuh-Hi with the ancient Babylonian "Tablet of Destiny" mentioned in the Enmeduranki Text, a copy of which was discovered in the archives of Asurbanipal[20] and is supposed to contain the "Mystery of Heaven and Earth?"

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[20] K2486 and K4364; cf. Zimmern, KAT³ 533.

Enmedurankl, king of Sippar, is the seventh of the aboriginal kings, and he declares that he received the divine tablet "from Anu, [Bel, and Ea]."[21]

Chinese sages have their own interpretation of the phrase "the mystery of heaven and earth." They would at once associate the words "heaven" and "earth" with the two opposing principles yang and yin, and the question is whether among the ancient Sumerians there was not a similar tendency prevalent. It seems to be not impossible that the Chinese tablet in the hands of Fuh-Hi is the same as the "Tablet of Destiny" of the Sumerians, and when some Assyriologist has informed himself of the primitive Chinese conception of this mysterious tablet, he may be able to throw some additional light on the subject.

DIVINATION.

An explanation of the universe which derives all distinctions between things, conditions, relations, etc., from differences of mixture, must have appeared very plausible to the ancient sages of China, and we appreciate their acumen when we consider that even to-day advanced Western scientists of reputation attempt to explain the universe as a congeries of force-centers, acting either by attraction or repulsion in analogy to positive and negative electricity. On the ground of this fact the educated Chinese insist with more than a mere semblance of truth, that the underlying idea of the Chinese world-conception is fully borne out and justified by the results of Western science.

While it is obvious that the leading idea of the yih is quite scientific, we observe that as soon as the Chinese thinkers tried to apply it *a priori* without a proper investigation of cause and effect, they abandoned more and more the abstract (and we may say, the purely mathematical) conception of the yang and yin, fell victims to occultism, and used the yih for divination purposes. When we compare the vagaries of the occultism of the yih with the accom-

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[21] Anu, Bel, and Ea are the Sumerian trinity. The words Bel and Ea are illegible on the tablet and have been restored by an unequivocal emendation. A doubtful word of the tablet has been translated by "omen" which presupposes that the translator regards the tablet as a means of divination.

plishments of Western science, we may feel very wise and superior, but we should not forget that it was the same fallacious argument of wrong analogy which produced in China the many superstitious practices of the yih, and in the history of our civilisation, astrology, alchemy, and magic. These pseudo-sciences were taken seriously in the world of thought throughout the Middle Ages and began to be abolished only after the Reformation with the rise of genuine astronomy, genuine chemistry, and genuine nature science. If the

A DIVINATION OUTFIT.

Chinese are wrong we must remember that there was a time when we made the same mistake.

The Chinese outfit for divination consists of fifty stalks called "divining-sticks" and six small oblong blocks to represent the hexagrams. These blocks are not unlike children's building-blocks, but they bear on two adjoining sides incisions dividing the oblong faces into equal sections, so as to give the surface the appearance of a yin figure. The sticks are made of stalks of the milfoil plant (*ptarmica sibirica*) which is cultivated on the tomb of Confucius and regarded as sacred.

Pious people consult the oracle on all important occasions. They are first careful to make themselves clean, and then assume a calm and reverential attitude of mind. The diviner then takes out one stick and places it in a holder on the center of the table. This single stalk is called "the grand limit" (*t'ai chih*), the ultimate cause of existence. He next lifts the forty-nine remaining sticks above his forehead with his right hand, and divides them at random into two parts, at the same time holding his breath and concentrating his thoughts on the question to be answered. The sticks in the right hand are then placed on the table, and one is taken out from them and placed between the fourth and fifth fingers of the left hand. The three groups are now called heaven, earth and man. The left-hand group is then counted with the right hand in cycles of eight, and the number of the last group yields the lower trigram of the answer, called the inner complement. This number is counted after the oldest order of the eight trigrams, viz., that of Fuh-Hi corresponding to the inverted binary arrangement. The upper trigram, called the outer complement, is determined in the same way.

After the hexagram is determined, one special line is selected by the aid of the divining-sticks in the same way as before, except that instead of counting in cycles of eight, the diviner now counts in cycles of six. Having thus established the hexagram and a special line in it, he next consults the *Yih King* which contains a definite meaning for each hexagram as a whole, and also for each single line; and this meaning is made the basis of the divine answer.

It is obvious that this complicated process presupposes a simpler one which, however, must have been in use in pre-historic times, for as far as Chinese history dates back the divining stalks and the kwa system are referred to in the oldest documents.

URIM AND THUMMIM.

The Chinese method of divination may help us to understand the Urim and Thummim of the Hebrews which are so ancient that details of their method are practically forgotten.

We notice first that the Urim and Thummim are two sets of symbols apparently forming a contrast similar to that of yin and

yang. It is not probable that they were a set of twelve gems repre-
senting the twelve tribes of Israel. Secondly, like the yin and yang,
the two sets must have been a plurality of elements and not only
two symbols as is sometimes assumed; and thirdly, they served the
purpose of divination, for they are referred to in connection with
the ephod which must have had something to do with the determin-
ing oracle.

The Urim and Thummim* are translated in the Septuagint†
by "manifestation and truth," or, as it has been rendered in Eng-
lish, "light and perfection." It appears that the vowel in the first
word is wrong, and we ought to read *Orim*, which is the plural
form of *Or*, "light," and might be translated by "the shining things."
If Thummim is to be derived from the root THAMAM, its vocali-
sation ought to be *thamim* (not *thummim*) and would mean "the
completed things."

We cannot doubt that the Urim and Thummim form a con-
trast, and if the Urim represent "light" or yang, the Thummim
would represent "darkness" or yin, the former being compared to
the rise of the sun, the latter to the consummation of the day.

Sometimes the answer of the Urim and Thummim is between
two alternatives (as in 1 Sam. xiv. 36 ff), some times a definite reply
is given which would presuppose a more or less complicated system
similar to the answers recorded in the *Yih King*. In the history
of Saul (1Sam. x. 22) the answer comes out, "Behold, he hath
hid hmself among the stuff," and in the time of the Judges (Judges
xx. 28) the question is asked about the advisability of a raid
against the tribe of Benjamin, and the oracle declares, "Go up; for
to-morrow I will deliver them into thine hand." On other occa-
sions the oracle does not answer at all,‡ and its silence is interpreted
as due to the wrath of God.

The answer received by consulting the Urim and Thummim
was regarded as the decision of God, and was actually called the
voice of God. This view seems to have led in later times, when
the process of divination was no longer understood, to the assump-

* הָאוּרִים וְהַתֻּמִּים

† δήλωσις καὶ ἀλήθεια.

‡ See Sam. xiv. 37 and xxviii. 6.

tion that Yahveh's voice could be heard in the Holy of Holies, a misinterpretation which is plainly recognisable in the story of the high priest Eleazar (Num. vii. 89).

The Urim and Thummim are frequently mentioned in close connection with the ephod which has been the subject of much discussion. It is commonly assumed that the word is used in two senses, first as an article of apparel and secondly as a receptacle for Urim and Thummim. Unless we can find an interpretation which shows a connection between the two, we can be sure not to have rightly understood the original significance of this mysterious article. The description of the ephod in Exodus ii. 28, (an unquestionably postexilic passage) is irreconcilable with the appearance, use or function which this curious object must have possessed according to our historical sources, and the latter alone can be regarded as reliable. After considering all the passages in which the ephod is mentioned we have come to the conclusion that it was a pouch worn by the diviner who hung it around his loins using the string as a girdle.

The original meaning of *ephod* is "girdle" and the verb *aphad* means "to put on, to gird." David, a strong believer in the Urim and Thummim, danced before the Lord "girded with an ephod," and we must assume that according to the primitive fashion the diviner was otherwise naked. Hence he incurred the contempt of his wife Michal whose piety did not go so far as the king's in worshiping Yahveh in this antiquated manner.

The main significance of the ephod in connection with the Urim and Thummim was to serve as a receptacle for the lots, and so it may very well have become customary to make it of a more costly and enduring material in the form of a vase. This will explain those passages in which the ephod is spoken of as being made of gold and standing on the altar, as where we are informed that the sword of Goliath had been deposited as a trophy wrapped in a mantle "behind the ephod."

There are other passages in which "ephod" seems to be identical with an idol, but if our interpretation be accepted there is no

difficulty in this, for the receptacle of the Urim and Thummim may very well have come to be regarded as an object of worship.

It is difficult to say whether the ephod is identical with the *khoshen,* the breastplate of the high priest, which in later postexilic usage was ornamented with twelve precious stones representing the twelve tribes of Israel. It is sure, however, that the Urim and Thummim cannot be identified with the twelve jewels, and the Hebrew words plainly indicate that they were placed inside as into a pouch. In Lev. xiii. 8 the verb *nathan el,* "to put into," is used and not *nathan 'al,* "to put upon."

The breastplate of the high priest seems to be the same as what is called in Babylonian history the "tables of judgment," which also were worn on the breast. But the identification does not seem convincing. We would have to assume that the ephod was first worn around the loins after the fashion of a loin cloth and that later in a more civilised age when the priests were dressed in sacerdotal robes, it was suspended from the shoulders and hung upon the breast.

After Solomon's time there is no longer any historical record of the use of the Urim and Thummim. It seems certain that in the post-exilic age the rabbis knew no more about it than we do to-day and regretted the loss of this special evidence of grace. They supposed their high priests must be no longer fit to consult the oracle (Esdras ii. 63; Neh. vii. 65) and Josephus states (*Antiq.* iii. 8-9) that two hundred years before his time, it had ceased. According to common tradition, however, it was never reintroduced into the temple service after the exile.

While Josephus identified the Urim and Thummim with the twelve jewels in the breastplate of the high priest, Philo* claims that they were pictures exhibited in the embroidery of the breastplate representing the symbols of light and truth. His conception is untenable, but it is noteworthy because his view seems to be influenced by his knowledge of the sacerdotal vestments of Egypt. We are told that the high priest in his capacity as judge used to wear a breastplate bearing the image of truth or justice. One such

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* *De vita Mosis,* p. 670 C; 671, D. E.; *De Monarchia,* p. 824, A.

shield has been found, upon which were two figures recognisable by the emblems on their heads: one with a solar disk as Ra, the sun-god or light, the other with a feather, as Maat or truth. If the Urim and Thummim were not plural and were not contrasts, and if we did not know too well that they were placed in an ephod, Philo's interpretation would have much to recommend itself. Perhaps he and also the Septuagint were under Egyptian influence.

While we do not believe that the Urim and Thummim were exactly like the yang and yin we are fully convinced that the Chinese method of divination throws some light upon the analogous Hebrew practice and will help us to understand the meaning of the terms. If the two systems are historically connected, which is not quite impossible, we must assume that they were differentiated while yet in their most primitive forms.

P'AN-KU.

The basic idea of the yih philosophy was so convincing that it almost obliterated the Taoist cosmogony of P'an-Ku who is said to have chiseled the world out of the rocks of eternity. Though the legend is not held in high honor by the *literati,* it contains some features of interest which have not as yet been pointed out and deserve at least an incidental comment.

P'an-Ku is written in two ways: one[8] means in literal translations, "basin ancient," the other "basin solid."[9] Both are homophones, i. e., they are pronounced the same way; and the former may be preferred as the original and correct spelling. Obviously the name means "aboriginal abyss," or in the terser German, *Urgrund,* and we have reason to believe it to be a translation of the Babylonian *Tiamat,* "the Deep."

The Chinese legend tells us that P'an-Ku's bones changed to rocks; his flesh to earth; his marrow, teeth and nails to metals; his hair to herbs and trees; his veins to rivers; his breath to wind; and his four limbs became pillars marking the four corners of the world, —which is a Chinese version not only of the Norse myth of the Giant Ymir, but also of the Babylonian story of Tiamat.

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[8] 盤古　　　　　　　[9] 閦

Illustrations of P'an-Ku represent him in the company of super-natural animals that symbolise old age or immortality, viz., the tortoise and the crane; sometimes also the dragon, the emblem of power, and the phenix, the emblem of bliss.

* * *

When the earth had thus been shaped from the body of P'an-Ku, we are told that three great rulers successively governed the world: first the celestial, then the terrestrial, and finally the human sovereign. They were followed by Yung-Ch'eng and Sui-Jen (i. e., fire-man) the latter being the Chinese Prometheus, who brought the fire down from heaven and taught man its various uses.

The Prometheus myth is not indigenous to Greece, where it received the artistically classical form under which it is best known to us. The name, which by an ingenious afterthought is explained as "the fore thinker," is originally the Sanskrit *pramantha*[10] and means "twirler" or "fire-stick," being the rod of hard wood which produced fire by rapid rotation in a piece of soft wood.

We cannot deny that the myth must have been known also in Mesopotamia, the main center of civilisation between India and Greece, and it becomes probable that the figure Sui-Jen has been derived from the same prototype as the Greek Prometheus.

THE FIVE ELEMENTS.

Occultism dominated the development of thought during the Middle Ages of China not less than in Europe, and here again in the conception of the elements we find traces of a common origin in both the East and West.

The Chinese speak of five elements: water, fire, wood, metal, and earth; while, according to the ancient sages of Hellas and India, there are but four: water, fire, earth, and air. This latter view also

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[10] See Steinthal's "The original Form of the Legend of Prometheus" which forms and appendix to Goldziher's *Mythology Among the Hebrews,* translated by Russell Martineau, London. 1877.

Mantha is derived from the same root as the German word *mangeln,* "to torture," and one who forces (viz. Agni, the god of fire) is called *prama-thyu-s* "the fire-robber." The Sanskrit name in its Greek form is Prometheus, whose nature of fire-god is still recognisable in the legend.

(although in a later age) has migrated to China, where it is commonly accepted among the Buddhists, but has been modified in so far as ether has been superadded so as to make the elements of the Buddhist-Chinese conception equal in number to the older enumeration which we may call the Taoist view.

CHINESE.   EUROPEAN.   STUPA FORM.   MEMORIAL POLE.
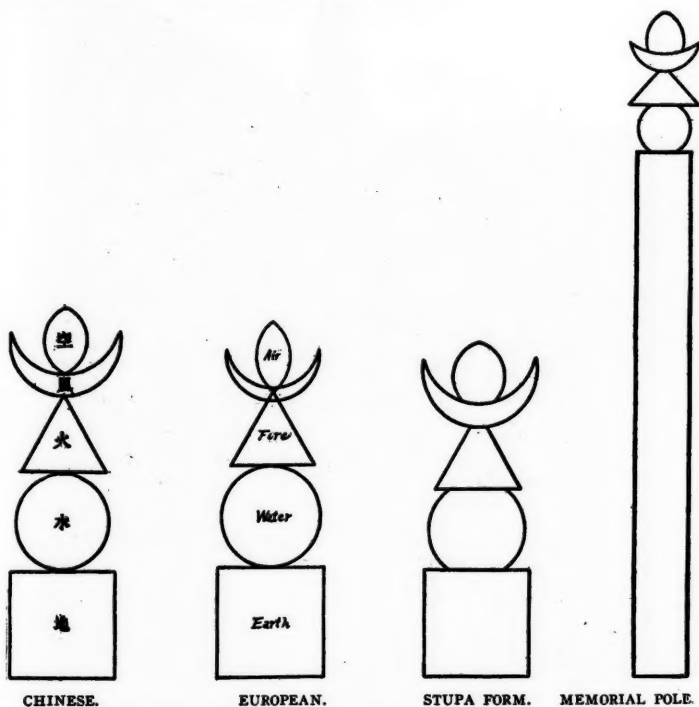
DIFFERENT REPRESENTATIONS OF THE ELEMENTS.

[The proportions of the several heights are deemed important, and are as follows: the square, 10; the circle, 9; the triangle, 7; the crescent, 2; the gem, 6. When built in the form of a *stupa,* the square changes into a cube, the circle into a globe, the triangle into a four-sided pyramid, and the crescent and gem also into solid bodies. The globe retains its proper dimensions but is, as it were, pressed into the cube and the pyramid; the pyramid is frequently changed into an artistically carved roof. The Mediæval European conception is obviously not original.

That the Buddhist conception of the five elements has been imported to China from India, is proved beyond question by the fact
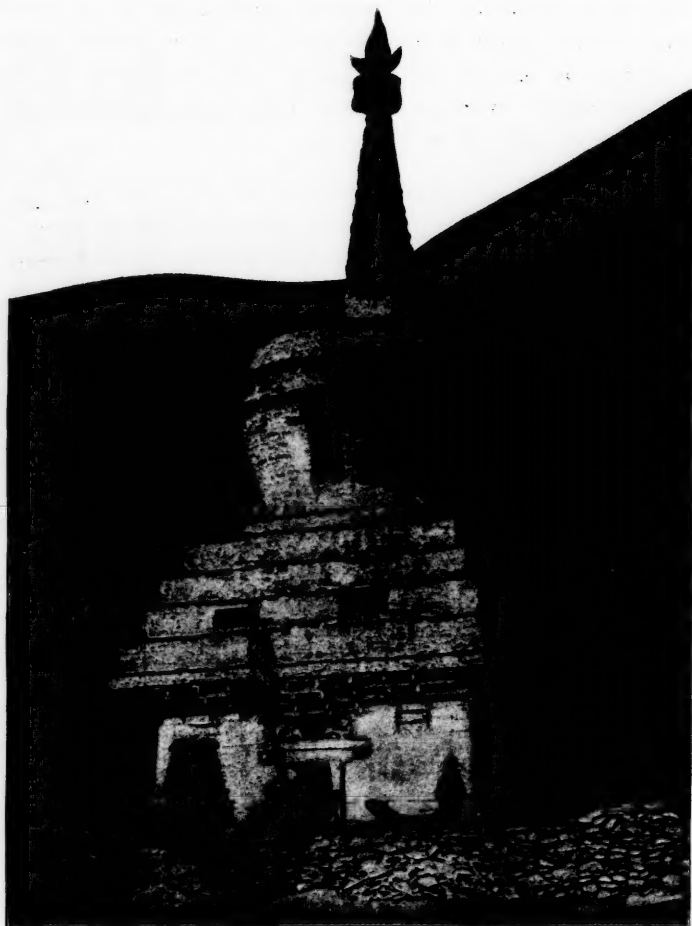
TIBETAN STUPA.

[This illustration is reproduced from the current number of the *East of Asia*, an illustrated magazine printed in Shanghai, China.

The monument represents the five elements, but its shape is no longer exact. The upper part of the cube shows a formation of steps, not unlike the Babylonian zikkurat or staged tower. The globe is no longer a true sphere, and the pyramid has been changed into a pointed cone, so slender as to be almost a pole. The monument is probably used as a mausoleum.]

that the Chinese diagrams are frequently marked with their Sanskrit terms. It is strange that the symbolic diagrams are more nearly identical than their interpretations. Earth is represented by a square, water by a sphere, fire by a triangle, air by a crescent,

GATEWAY TO BUDDHIST MONASTERY, PEKIN.

A further development of the Stupa of the five elements.

[The cube has been changed into a roofed house; the sphere has assumed the shape of a Chinese cap, the pyramid is adorned with a peculiar ornament imitative of a cover, and the crescent has been changed into a flower-like knob, as has also the gem which surmounts the whole.]

and ether by a gem surmounting the whole. The two upper symbols are conceived as one in the treatises of the mediæval alchemy of Europe, and serve there as the common symbol of air. The symbol ether is commonly called by its Sanskrit term *mani,* which literally means "gem," and in popular imagination is endowed with magic power.

The five elements are also represented by memorial poles which on the Chinese All Souls' Day are erected at the tombs of the dead, on which occasion the grave is ornamented with lanterns, and a torch is lit at evening.

All over the interior of Asia so far as it is dominated by Chinese civilisation, we find *stupas* built in the shape of the symbols of the five elements, and their meaning is interpreted in the sense that the body of the dead has been reduced to its original elements. We must not, however, interpret this idea in a materialistic sense, for it is meant to denote an absorption into the All and a return to the origin and source of life.

It is noticeable that this reverence of the elements as divine is a well-known feature of ancient Mazdaism, the faith of the Persians, and is frequently alluded to by Herodotus in his description of Persian customs. The desire not to desecrate the elements causes the Persians to regard burial and cremation as offensive. They deposit their dead in the Tower of Silence, leaving them there to the vultures, whereby the pollution by the corpse either of earth or of fire is avoided.

The Taoist view of the elements is different from the Buddhist conception, and we may regard it as originally and typically Chinese. At any rate it is full of occultism and constitutes an important chapter in the mystic lore of China. According to this view, the five elements are water, fire, wood, metal, and earth.* The knowledge of these elements, legend tells us, is somehow connected with the marks on the shell of the sacred tortoise which, having risen from the river Loh, appeared to Ts'ang-Hieh (Mayers, *Ch. R. M.,* I, 756). Tsou-Yen, a philosopher who lived in the fourth century B. C.,

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*水 火 木 金 土

. wrote a treatise on cosmogony in which the five elements play an important part (Mayers, *Ch. R. M.,* I, 746).

The five elements also figure prominently in "The Great Plan,"[11] which is an ancient imperial manifesto on the art of good government. There it is stated that like everything else they are produced by the yang and yin, being the natural results of that twofold breath which will operate favorably or unfavorably upon the living or the dead according to the combination in which they are mixed. All misfortunes are said to arise from a disturbance of the five elements in a given situation, and thus the Chinese are very careful not to interfere with nature or cause any disturbance of natural conditions. We are told in "The Great Plan"[12] that "in olden times K'wan dammed up the inundating waters and so disarranged the five elements. The Emperor of Heaven was aroused to anger and would not give him the nine divisions of the Great Plan. In this way the several relations of society were disturbed, and [for punishment] he was kept in prison until he died." K'wan's misfortune has remained a warning example to the Chinese. In their anxiety not to disturb the proper mixture in which the five elements should be combined they pay great attention to those pseudo-scientific professors who determine the prevalence of the several elements, not by studying facts but by interpreting some of the most unessential features, for instance, the external shape of rocks and plants. Pointed crags mean "fire"; gently rounded mountains, "metal"; cones and sugar-loaf rocks represent trees, and mean "wood"; and square plateaus denote "earth"; but if the plateau be irregular in shape so as to remind one of the outlines of a lake, it stands for "water." It would lead us too far to enter into further details; at the same time it would be difficult to lay down definite rules, as there is much scope left to the play of the imagination, and it is certain that, while doctors may disagree in the Western world, the geomancers of China have still more opportunity for a great divergence of opinion.

The elements are supposed to conquer one another according

[11] A chapter in the *Shu King,* translated into English by James Legge. S. B. E., vol. III, 137.

[12] See *S. B. E.,* III, 139.

to a definite law. We are told that wood conquers earth, earth conquers water, water conquers fire, fire conquers metal, and metal conquers wood. This rule which is preserved by Liu An of the second century B. C. is justified by Pan Ku, a historian of the second century A. D.,compiler of the books of the era of the Han dynasty, as follows:

"By wood can be produced fire, by fire can be produced earth [in other words, wood through fire is changed to ashes]; from earth can be produced metal [i. e., by mining]; from metal can be produced water [they can be changed through heat to a liquid state]; from water can be produced wood [plants]. When fire heats metal, it makes it liquid [i. e., it changes it into

THE FIVE ELEMENTS AND THEIR INTERRELATION.

ELEMENTS	PARENT	CHILD	ENEMY	FRIEND	PLANET
water's	metal	wood	earth	fire	Mercury
fire's	wood	earth	water	metal	Mars
wood's	water	fire	metal	earth	Jupiter
metal's	earth	water	fire	wood	Venus
earth's	fire	metal	wood	water	Saturn

the state of the element water]. When water destroys fire it operates adversely upon the very element by which it is produced. Fire produces earth, yet earth counteracts water. No one can do anything against these phenomena, for the power which causes the five elements to counteract each other is according to the natural dispensation of heaven and earth. Large quantities prevail over small quantities, hence water conquers fire. Spirituality prevails over materiality, the non-substance over substance, thus fire conquers metal; hardness conquers softness, hence metal conquers wood; density is superior to incoherence, therefore, wood conquers earth; solidity conquers insolidity, therefore earth conquers water."

Besides being interrelated as parent and offspring, or as friend and enemy, the five elements are represented by the five planets, so that water corresponds to Mercury, fire to Mars, wood to Jupiter, metal to Venus, and earth to Saturn.

The yih system being cosmic in its nature, has been used by the Chinese sages to represent the universe. The first attempt in this direction is Fuh-Hi's diagram in compass form representing the four quarters and four intermediary directions.

The system was changed by Wen Wang who rearranged the eight trigrams but retained the fundamental idea. It was supposed to have been revealed to Fuh-Hi on the back of a tortoise, but later sages superadded to the fundamental idea further characteristics of the universe, according to their more complicated knowledge of science and occultism.
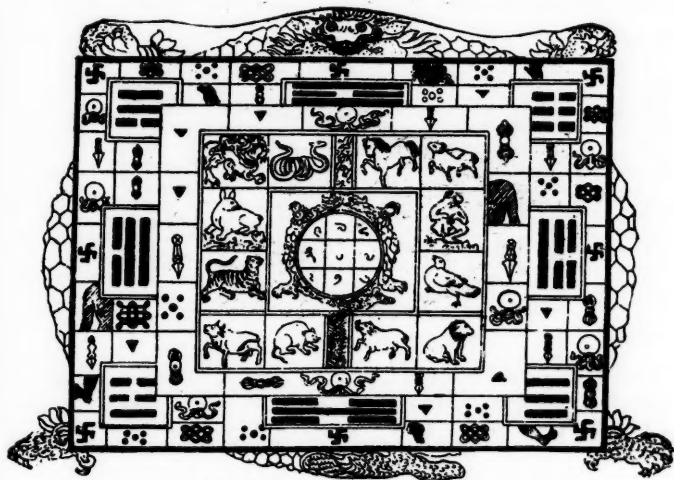
THE MYSTIC TABLET.[14]

We reproduce here a mystic tablet of Tibetan workmanship, which, however, reflects the notions prevailing over the whole Chinese empire. The kwa tablet lies on the back of the tortoise, presumably the same as was supposed to have been present when P'an-Ku chiseled the world from out of the rocks of eternity — and certainly the same tortoise which made its appearance in the Loh river to reveal the secret of the kwa to Fuh-Hi.

In the center of our kwa tablet is the magic square written in Tibetan characters, which is the same as that represented in dots

in the so-called "Writing of Loh."[13] It is also depicted as resting in its turn on the carapace of a smaller tortoise.

This magic square is surrounded by the twelve animals of the duodenary cycle, representing both the twelve double-hours of the day, and the twelve months of the year. In the left lower center is represented the rat which, in passing around to the left, is followed in order by the ox, tiger, hare, dragon, serpent, horse, goat, monkey, cock, dog, and boar. The symbols of the days are: a sun for Sunday, a crescent for Monday; a red eye for Tuesday (red light of the planet Mars); a hand holding a coin for Wednesday (indicating the function of the god Mercury); a thunderbolt for Thursday
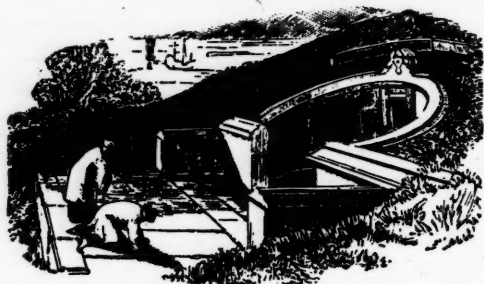
A TYPICAL CHINESE GRAVE.

[The dead are protected against the evil influence of unfavorably mixed elements in the surroundings of the grave by a horseshoe-shaped wall. Cf. pp. 531-2.]

(sacred to Marduk, Jupiter, Thor, the thunder-god); a buckle for Friday (day of Frigga or Venus); and a bundle for Saturday.

The duodenary cycle of animals is surrounded by various emblems indicating lucky and unlucky days. Among these we can discover gems, buckles, thunderbolts, various limbs of the body, triangles, five-spots, links of a chain, luck symbols, and swastikas.

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[13] See the author's pamphlet, *Chinese Philosophy*, p. 19.

[14] The table has been reproduced from Waddell's *Buddhism of Tibet*, p. 453. Students who take the trouble to enter into further details are warned that in Waddell's table, by some strange mistake, the position of the trigrams *tui* and *chan*, in the east and in the west, has been reversed, a mistake which we have corrected in our reproduction.

They surround the eight trigrams which are placed according to the arrangement of Wen Wang. The kwa in the lower part represents north and winter; in the upper part, the south and summer; toward the right, west and autumn; and toward the left, east and spring. The kwa in the lower right hand corner represents heaven; in the lower left, mountain; the upper left, air or wind; and in the right upper corner, earth.

SYSTEMS OF ENUMERATION.

The twelve animals which are pictured on our Tibetan tablet are a curious relic of prehistoric civilisation. They represent at once the twelve months, the twelve divisions of the zodiac, and the twelve double hours of the day. Kindred systems of designating duodecimal divisions of the cosmos, both in time and space, by a cycle of animals can be traced in Babylon, Egypt, primitive America, and modern Europe, where to the present day the constellations along the ecliptic are divided into twelve groups, called the Zodiac, or *Thierkreis,* i. e., the animal cycle.

The duodenary cycle is an ancient method of counting, expressed by animal names, a custom which has only been abolished in Japan since the Great Reform under the influence of Western civilisation. Up to that time people spoke there of "the rat hour," "the ox hour," "the tiger hour," etc., and these terms had no other significance than in Western countries, one o'clock, two o'clock, or three o'clock.

The twelve animals are affiliated with the twelve branches, so-called, which practically possess the same significance, being also a duodenary cycle. The twelve branches may be summarily characterised as the twelve months, beginning with the eleventh in which the yang principle begins to prepare for its appearance in the new year, and ending in the tenth month of the ensuing year. The twelve branches are correlated not only to the twelve animals, but also to the five elements as indicated in our diagram. The fifth element "earth" is missing because it represents the center around which the twelve branches are grouped.

THE DUODENARY CYCLE.

NO.	NAME	TRANSCRIPTION	THE TWELVE BRANCHES		ELEMENT TO WHICH RELATED	THE TWELVE ANIMALS	
			USUAL MEANING	SIGNIFICANCE IN THE DUODENARY CYCLE / SYMBOL		NAME	MEANING
1	子	tze	child	Regeneration of vegetation — Yang stirring underground	} water	鼠	rat
2	丑	chu	cord	Relaxation; untying a knot — Hand half-opened		牛	ox
3	寅	yin	to revere	Awakening of life. — Wriggling earthworm		虎	tiger
4	卯	mao	a period of time	Plants breaking through the soil — Opening a gate	} wood	兔	hare
5	辰	chen	vibration	First vegetation; seed-time — Thunderstorm		龍	dragon
6	巳	ssu	end	Supremacy of Yang — Snake		蛇	serpent
7	午	wu	to oppose	Yin reasserting itself — Female principle in hidden growth	} fire	馬	horse
8	未	wei	not yet	Taste of fruit — Tree in full bloom		羊	goat
9	申	shen	to expand	Yin growing strong — Clasped hands		猴	monkey
10	酉	yu	ripe	Completion — Cider or wine-press	} metal	雞	cock
11	戌	shu	guard	Exhaustion — Yang withdrawing underground		犬	dog
12	亥	hai	[Kernel]*	Kernel or root — Yang in touch with Yin	water	豬	boar

*This character has now no meaning except in its relation to the duodenary cycle. Formerly it denoted kernel, but now the character for tree is added to give that meaning.

There is another system of counting, which however is decimal, and is called "the ten stems"; and it appears that it is simply an older method of counting the months of the year. In their original here also the explanation of the several symbols has reference to the progress of the year.

It is not impossible that the decimal system was the original and indigenous Chinese method of counting, while the duodecimal system

THE TEN STEMS.

NO.	NAME	TRANSCRIPTION	SIGNIFICANCE	ELEMENT TO WHICH RELATED	
1	甲	chia	Yang moving in the East sprouting.	fir tree	} wood
2	乙	yi	Plant growing in a crooked way; tendril; twig.	bamboo	
3	丙	ping	Growth in southern heat; bloom.	torch-flame	} fire
4	丁	ting	Vegetation in warm season; summer.	lamp-light	
5	戊	wu	Exuberance; surcease of life.	mountains	} earth
6	己	ki	Wintry sleep; hibernation.	level ground	
7	庚	keng	Fullness of crops; the West; autumn fruit.	weapon	} metal
8	辛	sin	Ripened fruit and its flavor; supposed to be metallic.	cauldron	
9	壬	jen	Yin at the height of its function; pregnancy.	billow	} water
10	癸	kwei	Water absorbed by earth; Yang preparing for spring.	unruffled stream	

was imported at a very early date from Accad or Sumer, the country of the founders of Babylonian civilisation.

The existence of these two systems suggests the occurrence of a calendar reform such as was introduced in Rome under Numa Pompilius, and we are confronted with the strange coincidence that in China as well as in Rome the two additional months (January

and February) were inserted at the beginning as a result of which
we call even to-day the last month of the year December, i. e., "the
tenth." We must leave the question as to the plausibility of a his-
torical connection to specialists familiar with the influence of Baby-
lonian thought on the rest of the world. It is not impossible that
a Babylonian (perhaps Sumerian) calendar reform traveled in both
directions, rapidly toward the more civilised East, and very slowly
toward the West. producing in these remote countries and at differ-
ent times this startling coincidence of a similar calendar reform.

We might parenthetically state that the original meaning of
the ten stems and twelve branches has practically been lost sight of,
and both systems have become simply series of figures, the former
from one to ten, the latter from one to twelve; while their symbol-
ical relations, the former with the elements, the latter with the twelve
animals, are of importance merely to occultists.

The ten stems are also called "the ten mothers," and the twelve
branches, "the twelve children." That the former is the older ar-
rangement appears from another name which is "the ten hoary
characters.

By a combination of the ten stems with the twelve branches in
groups of two in which the former are repeated six times and the
latter five times, a series of sixty is produced which is commonly
called by sinologists the sexagenary cycle, and is used for naming
years as well as days. The invention of the sexagenary cycle and
its application to the calendar is attributed to Nao the Great, one
of the prime ministers of Hwang Ti, the Yellow Emperor,[15] who
had solicited this work in the sixtieth year of his reign. Nao the
Great, having accomplished the task, set the beginning of the new
era in the succeeding year, 2637 B. C. Accordingly we live now in
the seventy-sixth cycle which began in 1863 and will end in 1922.

A convenient method of translating the properly Chinese names
of the sexagenary cycle would be to render the two characters by
their equivalent relations to the twelve animals and the five elements,

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[15] According to traditional chronology, Hwang Ti reigned from 2697 to
2597 B. C.

THE SEXAGENARY CYCLE.

甲	子	1 chia tzu 1864	甲	申	21 chia shên 1884	甲	辰	41 chia chên 1904
乙	丑	2 yi ch'ou 1865	乙	酉	22 yi yu 1885	乙	巳	42 yi ssu 1905
丙	寅	3 ping yin 1866	丙	戌	23 ping shu 1886	丙	午	43 ping wu 1906
丁	夘	4 ting mao 1867	丁	亥	24 ting hai 1887	丁	未	44 ting wei 1907
戊	辰	5 mou chên 1868	戊	子	25 mou tzu 1888	戊	申	45 mou shên 1908
己	巳	6 chi ssu 1869	己	丑	26 chi ch'ou 1889	己	酉	46 chi yu 1909
庚	午	7 kêng wu 1870	庚	寅	27 kêng yin 1890	庚	戌	47 kêng shu 1910
辛	未	8 hsin wei 1871	辛	夘	28 hsin mao 1891	辛	亥	48 hsin hai 1911
壬	申	9 jên shen 1872	壬	辰	29 jên shên 1892	壬	子	49 jên tzu 1912
癸	酉	10 kwei yu 1873	癸	巳	30 kwei ssu 1893	癸	丑	50 kwei ch'ou 1913
甲	戌	11 chia shu 1874	甲	午	31 chia wu 1894	甲	寅	51 chia yin 1914
乙	亥	12 yi hai 1875	乙	未	32 yi wei 1895	乙	夘	52 yi mao 1915
丙	子	13 ping tzu 1876	丙	申	33 ping shên 1896	丙	辰	53 ping chên 1916
丁	丑	14 ting ch'ou 1877	丁	酉	34 ting yu 1897	丁	巳	54 ting ssu 1917
戊	寅	15 mou yin 1878	戊	戌	35 mou shu 1898	戊	午	55 mou wu 1918
己	夘	16 chi mao 1879	己	亥	36 chi hai 1899	己	未	56 chi wei 1919
庚	辰	17 kêng chên 1880	庚	子	37 kêng tzu 1900	庚	申	57 kêng shên 1920
辛	巳	18 hsin ssu 1881	辛	丑	38 hsin ch'ou 1901	辛	酉	58 hsin wu 1921
壬	午	19 jên wu 1882	壬	寅	39 jên yin 1902	壬	戌	59 jên shu 1922
癸	未	20 kwei wei 1883	癸	夘	40 kwei mao 1903	癸	亥	60 kwei hai 1923

so as to speak of the "fir-rat" year, the "bamboo-ox" year, the "torch-tiger" year, etc.

FENG-SHUI.*

Chinese occultism has been reduced to a system in an occult science (or better, pseudo-science) called *feng-shui* which, literally translated, means "wind and water," and the two words combined denote atmospheric influence, or climate. As a science feng-shui means a study of conditions, spiritual as well as physical, and the average Chinese is very anxious to locate the site of graves, temples, public and private edifices so as to insure the auspicious influence of their surroundings. Belief in the efficiency of feng-shui is very strong, and consequently its scholars play an important part in public and private life.

The science of feng-shui is fantastical, but its advocates claim the authority of the ancient *Yih King*, which in chapter XIII, 1 to 12, reads as follows:

"By looking up in order to contemplate the heavenly bodies, and by looking down to examine into the natural influences of the earth, man may acquire a knowledge of the cause of darkness and light."

Feng-shui is also called *ti-li*† and *k'an-yü.*‡ *Ti-li* may fitly be translated by "geomancy." *Li,* frequently translated by "reason" or "rational principle," means a system of the dominant maxims which govern nature. *Ti* means "the earth" and so the two together signify "the divining art as to terrestrial conditions." *K'an-yü,* translated literally, means "canopy chariot," but *k'an* (canopy) refers to the sky and *yü* (chariot) refers to the earth as the vehicle in which all living beings are carried. The term "canopy chariot" then means the art which is occupied with the conditions of man's habitation.

The professional diviners who use the net tablet are called *sien-sheng,*§ "the elder born," which is a title of respect and has been translated by "professor." They are called either *feng-shui sien-sheng,* "professors of divination," or *ti-li sien-sheng,* "geomancers," or *k'an-yü sien-sheng,* "masters of the canopied chariot."

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*風水   †地理   ‡堪輿   §先生

The application of the feng-shui is naturally very loose, and two different professors may easily come to opposite results according to their individual interpretation of the correct balance of the mixture of the elements and the several spiritual influences that may be discovered in the indications of the geomancer's compass. Prof. J. J. M. De Groot[16] explains the application of the lo-pan as follows:

"The chief use of the geomantic compass is to find the line in which, according to the almanac, a grave ought to be made, or a house or temple built. Indeed, in this most useful of all books it is every year decided between which two points of the compass the lucky line for that year lies, and which point is absolutely inauspicious. This circumstance not only entails a postponement of many burials, seeing it is not always possible to find a grave, answering to all the geomantic requirements, in the lucky line of the year; but it regularly compels the owners of houses and temples to postpone repairs or the rebuilding of the same until a year in which the line wherein their properties are situate is declared to be lucky. Many buildings for this reason alone are allowed to fall to ruin for years, and it is no rare thing to see whole streets simultaneously demolished and rebuilt in years auspicious to the direction in which they were placed."

Considering the sacrifices which are expected of a good son in the selection of the site and the general equipment of the parental graves, we can easily understand that the burden of ancestral worship is very heavy. While we must admire the filial piety of the Chinese, we regret to see the uselessness of their devotion and the waste to which it leads. It is refreshing, however, to observe that the general rule is not without exceptions and we find that there are sensible men who raise their voices in protest.

Ts'ui Yuen of the second century, a mandarin of high position, died at Loh-Yang, the imperial metropolis. According to the customary ritual, his son should have transported his remains to his place of birth for burial in the family cemetery, but Ts'ui Yuen left these instructions with his son Shih, which we quote from De Groot (*loc. cit.*, pp. 837-8):

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[16] In his voluminous work *The Religious System of China*, Vol. III, Bk. 1. "Disposal of the Dead." Part 3. "The Grave," p. 974.

"Human beings borrow from heaven and earth the breath upon which they live, and at the end of their terrestrial career they restitute the etherial parts of that breath to heaven, giving their bones back to earth; consequently, what part of the earth can be unsuitable for concealing their skeletons? You must not take me back to my place of birth, nor may you accept any funeral presents, neither offerings of mutton or pork."

The Chinese authority from which Professor De Groot quotes, adds:[17]

"Respectfully receiving these his last orders, Shih kept the corpse in Loh-Yang and there buried it."

The spirit of Ts'ui Yuen has not died out, as is attested by a satirical poem which is current to-day, and which humorously points out the inconsistency of those mantics or soothsayers who know all the conditions of the four quarters and promise their patrons to show them (for a due consideration) a spot so auspicious for a grave that the spirit of their ancestor will bestow upon members of the family the dignity of kings. If that were true, why have they not buried their own parents there? The poem in the original Chinese is as follows:

地理先生慣說謊、
指南指北指西東、
山中若有王侯地、
何不尋來葬乃翁.

ti li hsien sheng kwan shuo huang
chih nan chih pei chih hsi tung
shan chung je yu wang hou ti
he pu hsin lai tsang nai weng.[18]

This translation imitates the original as closely as possible in metre and meaning:

Trash these mantics manifest,
Point out south, north, east and west;
Know graves royalty bestowing
Yet their own sires there not rest.

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[17] *Books of the Later Han Dynasty,* Chap. 82 line 15.

[18] In the early Chinese form, the final words of the first, second, and fourth lines were all pronounced as if ending in *ong.* Consequently, although the individual words have changed their form, the series is considered as containing one rhyme and, according to Chinese rules of rhyming, is still so used in verse.

LO-PAN.

Collectors of curios may have seen in Chinese stores the instrument called *lo-pan** (net-tablet), or *lo-king*† (net-standard), or *pan-shih*‡ (disk-norm). This is the geomancer's compass which incorpo-

LO-PAN OR NET TABLET.
[The original is in the possession of Prof. Friedrich Hirth.]

rates the sum-total of feng-shui. The Chinese salesman who showed the instrument at my request, a man who must have lived half his life or more in the United States, expressed great respect for it and tried to impress me with the fact that it contained the deepest wisdom of the ages.

The lo-pan is a disk of lacquered wood, mostly of yellow color,

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* 羅盤　　† 羅經　　‡ 盤式

carrying in its center under glass, a small mariner's compass. Some of the characters written in the surrounding circles are red, and some are black. Different copies differ in details, but all are practically the same in their general and most characteristic features. The concentric circles of the net tablet are called *ts'eng,** i. e., "tiers," "stories," or "strata."

The mariner's compass in the center represents *t'ai chih,*† "the great origin." The first circle contains the eight trigrams in the arrangement of Fuh-Hi, which denote the eight directions of the compass and the virtues and properties attributed to them.

The second circles contains the numerals from one to nine in the arrangement of the magic square, the five being omitted as it belongs in the center. Accordingly the sum of each two opposite figures always makes ten.

The third row represents twenty-four celestial constellations, each expressed in two characters, so that three names are registered in each octant.

The fourth circle represents in occult terms twenty-four divisions of the compass. Southeast, southwest, northeast, and northwest are written in their kwa names, while the rest are designated alternately by the ten stems and twelve branches; two of the stems are omitted, however, because referring to the element earth, they are supposed to belong in the center. If we write the ten stems as numerals from one to ten, the twelve branches in italic letters from *a* to *m,* and the four kwa names in Roman capitals A to D, we have the following arrangement, beginning in the southeast: A *f* 3 *g* 4 *h* B *i* 7 *k* 8 *l* C *m* 9 *a* 10 *b* D *c* 1 *d* 2 *e*. This arrangement is ancient for it is quoted as an established part of the divining method by Sze-Ma Ch'ien in the twenty-fifth chapter of his *Historical Records,* which is devoted to the art of divination.

The fifth circle is divided into seventy-two parts each containing two characters of the sexagenary cycle, written one above the other, and arranged in groups of five divided by blank spaces. If we again express the ten stems in figures and the twelve branches

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*曆   †太極

in italics, the scheme (starting with the first branch *a* standing in the north) reads as follows:

1 3 5 7 9	2 4 6 8 10	3 5 7 9 1	4 6 8 10 2	5 7 9 1 3	6 8 10 2 4
a a a a a	*b b b b b*	*c c c c c*	*d d d d d*	*e e e e*	*f f f f*
7 9 1 3 5	8 10 2 4 6	9 1 3 5 7	10 2 4 6 8	1 3 5 7 9	2 4 6 8 10
g g g g g	*h h h h h*	*i i i i i*	*k k k k k*	*l l l l l*	*m m m m m*

In the sixth row each octant is divided into three sections, each having five compartments in the second and fourth of which appear two characters of the sexagenary cycle. Accordingly they are arranged in the following order, the blanks being expressed by zeros:

0 3 0 7 0	0 3 0 7 0	0 4 0 8 0	0 4 0 8 0	0 3 0 7 0	0 3 0 7 0
0 *a* 0 *a* 0	0 *a* 0 *a* 0	0 *b* 0 *b* 0	0 *b* 0 *b* 0	0 *c* 0 *c* 0	0 *c* 0 *c* 0
0 4 0 8 0	0 4 0 8 0	0 3 0 7 0	0 3 0 7 0	0 4 0 8 0	0 4 0 8 0
0 *d* 0 *d* 0	0 *d* 0 *d* 0	0 *e* 0 *e* 0	0 *e* 0 *e* 0	0 *f* 0 *f* 0	0 *f* 0 *f* 0
0 3 0 7 0	0 3 0 7 0	0 4 0 8 0	0 4 0 8 0	0 3 0 7 0	0 3 0 7 0
0 *g* 0 *g* 0	0 *g* 0 *g* 0	0 *h* 0 *h* 0	0 *h* 0 *h* 0	0 *i* 0 *i* 0	0 *i* 0 *i* 0
0 4 0 8 0	0 4 0 8 0	0 3 0 7 0	0 3 0 7 0	0 4 0 8 0	0 4 0 8 0
0 *k* 0 *k* 0	0 *k* 0 *k* 0	0 *l* 0 *l* 0	0 *l* 0 *l* 0	0 *m* 0 *m* 0	0 *m* 0 *m* 0

The third and fourth stems refer to fire and the seventh and eighth to metal.

The seventh row is devoted to the eight stars of the Dipper, which in Chinese folklore is regarded with much awe, because this most conspicuous constellation revolves around the polar star and seems to resemble the hand of a watch on the great celestial dial of the universe. We must remember that the seventh star is double, its luminous satellite being visible even without the assistance of a telescope. If we represent the names of the eight stars by numbers from one to eight, their arrangement beginning with the southwest is as follows: 1 8 5 7 4 4 6 2 3 1 5 7 8 1 3 2 6 6 4 7 5 8 3 2.

Beyond the seventh circle we have a double line which divides the seven inner rows from the nine outer ones. The first of these, the eighth circle, is divided into twelve sections each having three characters, the central ones written in red being the sun and moon

together with the five elements twice repeated. Beginning in the south with the character sun, and turning toward the left, they read as follows: sun, moon, water, metal, fire, wood, earth, earth, wood, fire, metal, water.

The ninth row, consisting of twelve sections, represents the twelve branches in regular succession, beginning in the north with the first and turning toward the right. They coincide in position with the twelve branches as they appear in the fourth row.

The tenth row is a repetition of the fifth, with the exception that here the characters are distributed evenly over the whole circle.

The eleventh row consists of numerals only. The circle is divided into twelve sections, each being subdivided into five compartments which contain the following scheme repeated twelve times: | 3 7 | 1 | 5 | 1 | 7 3 |.

The twelfth row is inscribed with the names of the sub-divisions of the four seasons, beginning with early spring above the unalloyed yin and turning toward the right.

SPRING.

立春 Beginning of Spring.

雨水 Rain Water.

驚蟄 Resurrection of hibernating Insects.

春分 Vernal Equinox.

清明 Pure Brightness.

穀雨 Rains over the Grain.

SUMMER.

立夏 Beginning of Summer.

小滿 Grain filling a little.

芒種 Grain in Ear.

夏至 Summer Solstice.

小暑 Slight Heat.

大暑 Great Heat.

AUTUMN.

立秋 Beginning of Autumn.

處暑 Limit of Heat.

白露 White Dew.

秋分 Autumnal Equinox.

寒露 Cold Dew.

霜降 Descent of Hoar Frost.

WINTER.

立冬 Beginning of Winter.

小雪 Little Snow.

大雪 Heavy Snow.

冬至 Winter Solstice.

小寒 Little Cold.

大寒 Severe Cold.

The thirteenth row is divided into seventy-two equal parts, which are left blank.

The fifteenth row is divided into three hundred and sixty equal blanks representing the degrees of a circle which method of division the Chinese as well as we of the Occident have inherited from the Babylonians.

The sixteenth row contains the names of the twenty-eight constellations together with the number of degrees which each covers. These degrees are specifically marked in the fourteenth circle in which the odd numbers only are expressed. The series starting in the southeast and turning toward the right, is as follows:

1. The horn, 11°; in Virgo.
2. The neck, 11°; in Virgo.
3. The bottom, 18°; in Libra.
4. The room, 5°; in Scorpio.
5. The heart, 8°; in Scorpio.
6. The tail, 15°; in Scorpio.
7. The sieve, 9°; in Sagittarius.
8. The measure, 24°; in Sagittarius.
9. The ox, 8°; in Aries and Sagittarius.
10. The damsel, 11°; in Aquarius.
11. The void, 10°; in Aquarius and Equuleus.
12. Danger, 20°; in Aquarius and Pegasus.
13. The house, 16°; in Pegasus.
14. The wall, 13°; in Pegasus and Andromeda.
15. Astride, 11°; in Andromeda and Pisces.
16. The hump, 13°; in Aries.
17. The stomach, 12°; in Musca Borealis.
18. The Pleiades, 9°. (In Chinese *mao*.)[19]
19. The end, 15°; in Hyades and Taurus.
20. The bill or beak, 1°; in Orion.
21. Crossing, or mixture, 11°; in Orion.
22. The well or pond, 31°; in Gemini.
23. The ghost, 5°; in Cancer.
24. The willow, 17°; in Hydra.

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[19] The Chinese term *mao* does not possess any other significance except the name of this constellation. This character is unfortunately misprinted in Mayers, *Chinese Reader's Manual*. It is correct in the enumeration of Professor De Groot, *loc. cit.*, p. 972.

25. The star, 8°; in Hydra.
26. The drawn bow, 18°; in Hydra.
27. The wing, 17°; in Crater and Hydra.
28. The back of a carriage seat, 13°; in Corvus.
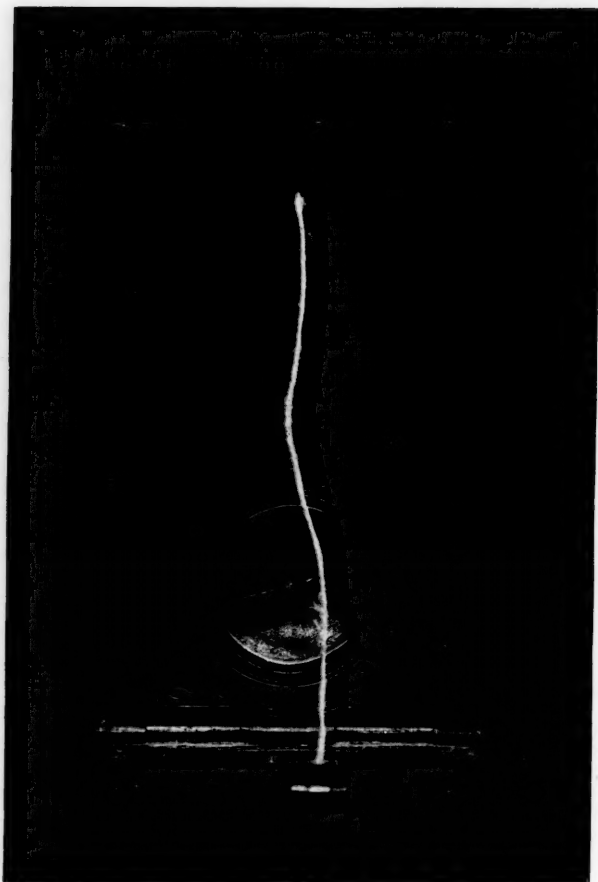
CHINESE POCKET COMPASS.

The two plates are hinged together and fold upon one another in the same way as the European compasses shown in the following pages.

THE MARINER'S COMPASS A CHINESE INVENTION.

The lo-pan or net tablet unquestionably serves superstitious purposes, but we must bear in mind that much genuine science is incorporated in many of its details, and the latter no doubt has given countenance to the former. This again is according to the general law of the evolution of mankind and finds its parallel in the history of European civilisation. We must bear in mind that the great occultists of the Middle Ages, Paracelsus, Albertus Magnus, and

EUROPEAN COMPASS.
(Presumably Italian.)

men like them down to Agrippa of Nettesheim, were the most powerful intellects of their day; and though they were deeply entangled in mysticism, much of their life's work was devoted to the furtherance of genuine scientific enquiry.

In the Chinese Middle Ages the leading thinkers were of the same stamp, and so it is natural that much of genuine astronomy and the results of accurate observation of the stars are incorporated in the lo-pan. The most obvious part of it which must have ap-
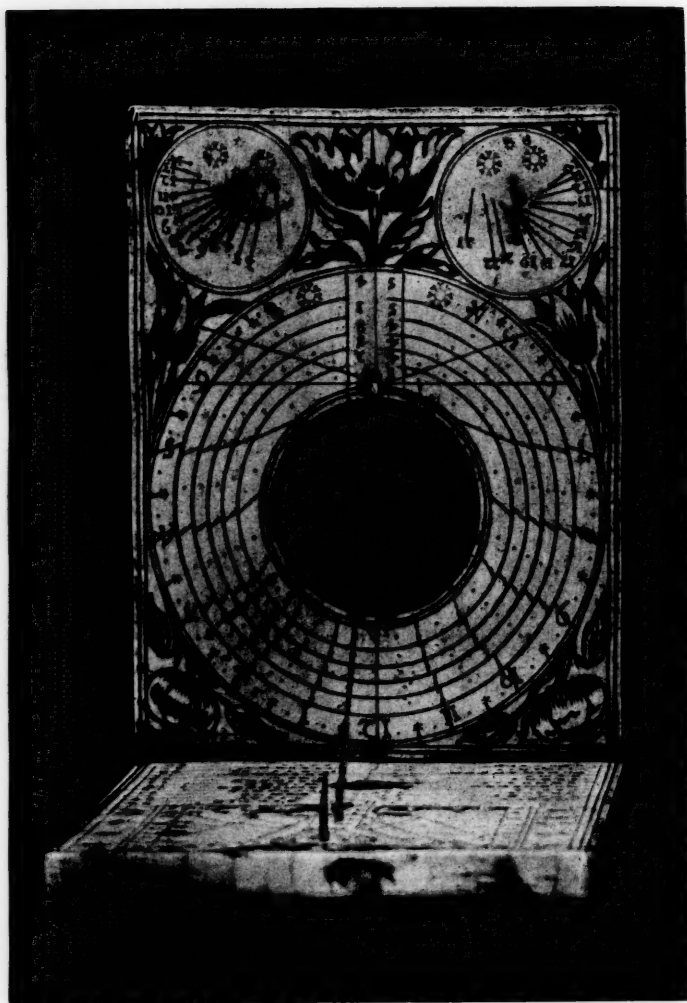
EUROPEAN COMPASS.
(Presumably Nuremberg.)

peared extremely mystifying in former centuries was, as the Chinese call it, the south-pointing needle—the mariner's compass—situated in the center of the lo-pan.

The south-pointing needle is an ancient Chinese invention which for some time seems to have been forgotten. Professor Friedrich Hirth of Columbia University has privately communicated to me facts which prove that it was employed in ancient times by travelers through the desert, that the invention was lost and had to be rediscovered. We would add, too, that the Chinese invention became known in Europe after the time of Marco Polo where it was soon used as a mariner's compass. The incident is well known and can easily be established on the testimony of literary sources, but while sauntering through the National Museum at Washington, the writer discovered a palpable evidence in the show cases there exhibited, which displayed the Chinese pocket instruments containing south-pointing needles presumably a few centuries old, side by side with European compasses. They are of the same oblong shape and consist of two tablets hinged in the same manner. The European instruments have sun-dials in addition and are decidedly more serviceable for practical use but we can not doubt that for the original idea our ancestors are indebted to our Mongol fellow-men.*

THE PERSONIFICATION OF STARS.

To the Chinese (as also in some respects to the Babylonians) the stars are actual presences who sway the destinies of mankind, and we reproduce here a series of illustrations from a Buddhist picture-book printed in Japan. They are based upon ancient traditions ultimately derived from Sumer and Accad, but we have at present no means to determine the question of their history, especially as to their fate in China. One thing, however, may be regarded as certain, viz., that their traditional forms are prior to the calendar reform of the Jesuits. Hence we must assume that they have been imported by the way on

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* We wish to express here our indebtedness to the National Museum and its officers, and especially to Prof. Otis T. Mason and Mr. George C. Maynard. for the reproduction of characteristic specimens of this interesting collection.

land either by the Buddhists from India, or through some earlier civilising influences perhaps from ancient Babylon, or may be in later times from Greece by way of Bactria and Tibet. An historical

connection of some kind or other with Western astronomy which also derives its origin from ancient Babylon, can scarcely be doubted; for the general similarities are too pronounced, and the more par-

ticular ones serve as obvious evidences which cannot be rejected, while the differences afford suggestions in regard to their development and fate.

According to the Chinese and Japanese custom, the series begins in the right upper corners and the order proceeds downwards and to the left.

The first figure represents the sun; the second, the moon. In

the next row we see the polar star seated (like Buddha) on a lotus
and holding in his hands a wheel to indicate that he is the hub of
the heavens.　As Buddha in the spiritual world, so the polar star

among the constellations is alone at rest while all other things in the
universe whirl round in unceasing rotation.　In the same column is
the star of twilight-brightness, which may be either the morning or
evening star.

The third row of the same page begins the series of stars that constitute Ursa Major, popularly called "the dipper" in America and known in China as "the bushel."

北八宿

第八

第九

The satellite of the seventh star in Ursa Major is pictured as a smaller companion in the right hand corner in the field of his bigger brother. Since he stands at the very point of the constella-

tion, his significance is in inverse proportion to his size, in a similar way as Tom Thumb always takes the initiative in all deeds and proves to be the saviour of his seven brothers.

The seven planets are here increased after the precedence of Hindu astrology by two three-headed figures called *Rahu* and *Ketu*, the former being conceived as the head, and the latter as the tail of

the monster who is supposed to be responsible for solar and lunar eclipses.

Next in order on our tables beginning with the second column

of their fourth page, are the twenty-eight constellations mentioned above which play an important part in Chinese occultism. The approximate outline of the constellation is indicated in each case above

the picture, and we see, for instance, why the fifteenth constellation is called "astride," and the twenty-sixth, a "drawn bow."

The stars corresponding to our signs of the zodiac are named

differently in Chinese. The characters on the lo-pan are presumably the older and the originally Chinese way of naming the constella-tions of the ecliptic, while our Buddhist picture-book incorporates a later view, and we are inclined to regard it as imported by Bud-

dhist missionaries from India. Nine names among the twelve correspond very closely to ours, but the order in which they occur is different.

In our researches we have never entered deeply into comparative astronomy, but judging from suggestions of scholars who have made a specialty of this interesting branch of human lore, we can say positively that the Babylonian origin of the division and names

of the zodiac has been firmly established. Prof. Franz Boll has collected all pertinent material of Greek texts and also illustrations of several ancient representations of the starry heavens in his book,

Sphaera, neue griechische Texte und Untersuchungen zur Geschichte der Sternbilder (Leipsic, Teubner, 1903). He also refers to the method prevalent in Eastern Asia, of counting hours, months, and

years by the duodenary system of animals and points out its simi-
larities to the Babylonian system (pp. 326 ff.). The facts presented
here in our article can only corroborate Professor Boll's theory.

In addition to Professor Boll's work, the writer has had the
advantage of consulting some manuscript notes of an American
sinologue, Mr. Richard H. Geoghegan of Seattle, Washington, who
compares the calendar system of China to that of the Maya in

Central America, and arrives at the conclusion that the latter must have derived the inspiration of its origin from the former.

In consideration of the fact that the calendar systems of prehistoric peoples in Asia and America exhibit similarities which are still traceable in our nomenclature of the zodiac, we come to the conclusion that the interrelations of primitive mankind must have been much closer than is commonly assumed.*

PREHISTORIC CONNECTIONS.

The evidences that indicate a Western origin of Chinese civilisation are very strong, and it seems that the first Chinese settlers must have come in prehistoric times from a country that was closely connected with the founders of Babylonian culture. There is an unmistakable resemblance between cuneiform writing and Chinese script, so as to make it quite probable that they have been derived from a common source. We have, further, the sexagenary cycle corresponding to the use of the number sixty in Babylonia. We ourselves have retained some of the names for the signs of the zodiac that were used in Babylon, and the Chinese have done the same. Moreover, the Chinese divide the circle into three hundred and sixty degrees as did the Babylonians, a system which has been adhered to in the West down to modern times.

The Prometheus legend seems to come from the same source (presumably Accad) as the story of the Chinese "Fire Man," Sui-Jen. The Babylonian story of Tiamat as to the formation of the world is repeated in the legend of P'an-Ku, the personification of the ancient abyss.

Finally the yih system of the yang and the yin is paralleled in at least one Semitic tribe by the similar divining method of the Urim and Thummim. Though in the latter case the loss of details prevents us from having any evidence of a historical connection, the similarity of the purpose, as well as the duality of the elements of the oracle cannot be denied.

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* As soon as we see our way in overcoming the difficulties of reproducing the Chinese characters and the Mayan symbols, we will proceed to publish Mr. Geoghegan's article in the the columns of *The Monist.*

If none of these indications is conclusive when considered separately, we can not disregard them when all are taken together.

Further bearing in mind that there is an ancient tradition in China of a settlement having been made by a tribe coming from the Far West, we may very well assume the ancestors of the Chinese to be a detachment of the founders of the Babylonian civilisation, either Sumerians or Accadians, and that they left their home in prehistoric times presumably even before the first Semitic invasion or soon afterwards. They were perhaps that portion of the people who would not submit to the new condition of things and preferred exile to absorption by a victorious enemy.

CONCLUSION.

Chinese occultism has its great faults, yet it is based upon a world conception which is not only rational but even in close agreement with some leading principles of Western science; and there is scarcely a superstition in Cathay which has not at one time or another prevailed in European countries, if not in the same, at least in an analogous form. We, too, had the measles in our childhood; so we have no reason to ridicule the Chinese because they (or at least large classes of the population) have them still.

From the standpoint of comparative ethnology and especially ethnic psychology, a knowledge of the Chinese mode of thinking is of great importance; for the Chinese are so different from all other existing nations in their world conception, and in their ways of arguing, as well as living, that they seem to have developed a type of humanity of their own. Yet the differences are only in externals and their main logical as well as moral notions are practically the same as those which prevail among the nations of Europe. Those traits, however, which are different are deeply rooted in the aboriginal character of the Chinese nation and pervade their entire history. These strange people have developed on different lines, and though they started with great promise, having made rapid strides at the very beginning of their civilisation, they exhibited a most devout reverence toward the past which resulted in an un-

paralleled conservatism in their national institutions that worked as a brake upon progress, and rendered their further evolution almost stagnant. Because of this they have been easily overtaken by the younger nations of the West who were still barbarians, nay, savages, when China had attained a high grade of civilisation. We should not forget that we owe to China all the inventions which in their entirety produced the latest phase of our civilisation, viz., the invention of printing, the manufacture of paper, the use of the mariner's compass, and last but not least, the invention of gunpowder. Reports of these inventions, not to mention others of less significance, such as the manufacture of porcelain, silk culture, etc., had reached Europe through travelers who at first were scarcely believed, but the result was a rediscovery of these ancient Chinese inventions and their more systematic application in practical life. While the Chinese, almost since the days of Confucius, have made little advance in the arts and sciences, Europe grew rapidly in knowledge, wealth, and power, having now reached a stage which might be called "the age of science."

It is difficult for us to-day to understand how the Chinese can be so impervious to progress, how they can be so proud of their own civilisation, the imperfections of which appear obvious to us. We find an answer to these problems when we become acquainted with the Chinese mode of speaking, writing, and thinking. If we want to comprehend their errors we must know that these are but the reverse aspect of their proficiencies, and their faults are frequently misapplied virtues. We shall be better able to deal with the Chinese when we study their character as a whole by contemplating the dark aspects of the picture as the shades that are produced by the light that falls upon things. In this sense and for the purpose of furnishing the necessary material for a psychological appreciation of the Chinese nationality, we have sketched here and in some previous articles, in bare outlines, the main characteristic features of the Chinese world-conception. We hope that we have helped thereby to contribute a little toward the realisation of the great ideal of peace on earth and good will among men.

EDITOR.

MAGIC SQUARES.

[CONCLUSION.]

EVEN MAGIC SQUARES.

THE writer believes that the method of constructing even magic squares by a predetermined geometrical arrangement of numbers is new and original. It will be noted that the foregoing dia-

1	195	3	193	5	191	190	7	188	10	186	12	184	14
182	16	180	18	178	20	176	175	23	173	25	171	27	15
168	167	31	165	33	163	35	36	160	38	158	40	30	155
43	153	152	46	150	48	148	147	51	145	53	45	142	56
140	58	138	137	61	135	63	64	132	66	60	129	69	127
71	125	73	123	122	76	120	119	79	75	116	83	114	84
112	86	110	88	108	107	91	92	90	103	95	101	87	98
96	100	96	102	89	93	105	106	104	94	109	87	111	85
113	83	115	74	80	118	78	77	121	117	11	124	72	126
70	128	59	67	131	65	133	134	62	136	130	68	139	57
141	44	54	144	52	146	50	49	149	47	151	143	55	154
30	41	157	38	159	37	161	162	34	164	32	166	156	42
28	170	26	172	24	174	21	22	177	19	179	17	181	169
183	13	185	11	187	6	8	189	9	192	4	194	2	196

Fig. 66.

grams illustrate in a graphic manner the interesting results attained by the harmonious association of figures, and they also clearly demonstrate the almost infinite variety of possible combinations.

THE CONSTRUCTION OF EVEN MAGIC SQUARES BY DE LA HIRE'S METHOD.

A perfect magic square of 4 × 4 may be constructed as follows:

1. Fill the corner diagonal columns of a 4 × 4 square with the numbers 1 to 4 in arithmetical sequence, starting from the upper and lower left hand corners (Fig. 67).
2. Fill the remaining empty cells with the missing numbers of the series 1 to 4 so that the sum of every perpendicular and horizontal column equals 10 (Fig. 68).

Fig. 67.   Fig. 68.   Fig. 69.

3. Construct another 4 × 4 square, having all numbers in the same positions relatively to each other as in the last square, but reversing the direction of all horizontal and perpendicular columns (Fig. 69).
4. Form the key square Fig. 70 from Fig. 69 by substituting key numbers for prime numbers, and then add the numbers in this key square to similarly located numbers in the primary square Fig. 68. The result will be the perfect square of 4 × 4 shown in Fig. 72.

By making the key square Fig. 71 from the primary square Fig. 68 and adding the numbers therein to similarly located numbers in the primary square Fig. 69, the same magic square of 4 × 4 will be produced, but with all horizontal and perpendicular columns reversed in direction as shown in Fig. 73.

The magic square of 6 × 6 shown in Figure 46 and also a large number of variations of same may be readily constructed by

the De la Hire method, and the easiest way to explain the process will be to analyze the above mentioned square into the necessary primary and key squares, using the prime numbers 1 to 6 with their respective key numbers as follows:

Prime numbers 1, 2, 3, 4, 5, 6.
Key numbers   0, 6, 12, 18, 24, 30.

The cells of two 6 × 6 squares may be respectively filled with prime and key numbers by analyzing the contents of each cell in Fig. 46. Commencing at the left hand cell in the upper row, we note that this cell contains 1. In order to produce this number by the addition of a prime number to a key number it is evident that

PRIME NUMBERS	KEY NUMBERS
1	0
2	4
3	8
4	12

0	12	12	0
8	4	4	8
4	8	8	4
12	0	0	12

Fig. 70.

0	8	4	12
12	4	8	0
12	4	8	0
0	8	4	12

Fig. 71.

1	15	14	4
12	6	7	9
8	10	11	5
13	3	2	16

Fig. 72.

1	12	8	13
15	6	10	3
14	7	11	2
4	9	5	16

Fig. 73.

0 and 1 must be selected and written into their respective cells. The second number in the top row of Fig. 46 being 35, the key number 30 must be written in the second cell of the key square and the prime number 5 in the second cell of the prime square, and so on throughout all the cells, the finished squares being shown in Figs. 74 and 75.

Another prime square may now be derived from the key square Fig. 74 by writing into the various cells of the former the prime numbers that correspond to the key numbers of the latter. This second primary square is shown in Fig. 76. It will be seen that the numbers in Fig. 76 occupy the same relative positions to each other

as the numbers of the first primary square (Fig. 75), but the direction of all columns is changed from horizontal to perpendicular, and vice versa.

To distinguish and identify the two primary squares which are used in these operations, the first one (in this case Fig. 75) will in future be termed the A primary square, and the second one (in this case Fig. 76) the B primary square.

1	35	34	3	32	6
30	8	28	27	11	7
24	23	15	16	14	19
13	17	21	22	20	18
12	26	9	10	29	25
31	2	4	33	5	36

Fig. 46 (Dup.)

0	30	30	0	30	0
24	6	24	24	6	6
18	18	12	12	12	18
12	12	18	18	18	12
6	24	6	6	24	24
30	0	0	30	0	30

Fig. 74.

It is evident that the magic square of 6 × 6 shown in Fig. 46 may now be reconstructed by adding the cell numbers in Fig. 74

1	5	4	3	2	6
6	2	4	3	5	1
6	5	3	4	2	1
1	5	3	4	2	6
6	2	3	4	5	1
1	2	4	3	5	6

Fig. 75.

1	6	6	1	6	1
5	2	5	5	2	2
4	4	3	3	3	4
3	3	4	4	4	3
2	5	2	2	5	5
6	1	1	6	1	6

Fig. 76.

to the similarly placed cell numbers in Fig. 75. Having thus inversely traced the development of the magic square from its A and B primary and key squares, it will be useful to note some of the general characteristics of even primary squares, and also to study the rules which govern their construction, as these rules will be found instructive in assisting the student to work out an almost endless variety of even magic squares of all dimensions.

1. Referring to the 6 × 6 A primary square shown in Fig. 75, it will be noted that the two corner diagonal columns contain the numbers 1 to 6 in arithmetical order, starting respectively from the upper and lower left hand corner cells, and that the diagonal columns of the B primary square in Fig. 76 also contain the same numbers in arithmetical order but starting from the two upper corner cells. The numbers in the two corner diagonal columns are subject to many arrangements which differ from the above but it will be unnecessary to consider them in the present article.

2. The numbers in the A primary square Fig. 75 have the same relative arrangement as those in the B primary square Fig. 76, but the horizontal columns in one square form the perpendicular columns in the other and vice versa. This is a general but not a universal relationship between A and B primary squares.

3. The sum of the series 1 to 6 is 21 and the sum of every column in both A and B 6 × 6 primary squares must also be 21.

4. The sum of every column in a 6 × 6 key square must be 90, and under these conditions it follows that the sum of every column of a 6 × 6 magic square which is formed by the combination of a primary square with a key square must be 111 (21 + 90 = 111).

5. With the necessary changes in numbers the above rules hold good for all sizes of A and B primary squares and key squares.

We may now proceed to show how a variety of 6 × 6 magic squares can be produced by different combinations of numbers in primary and key squares. The six horizontal columns in Fig. 75 show some of the combinations of numbers from 1 to 6 that can be used in 6 × 6 A primary squares, and the positions of these columns or rows of figures relatively to each other may be changed so as to produce a vast variety of squares which will naturally lead to the development of a corresponding number of 6 × 6 magic squares.

In order to illustrate this in a systematic manner the different rows of figures in Fig. 75 may be rearranged and identified by letters as given in Fig. 77.

a	1	2	4	3	5	6
b	1	5	4	3	2	6
c	1	5	3	4	2	6
d	6	5	3	4	2	1
e	6	2	3	4	5	1
f	6	2	4	3	5	1

Fig. 77.

Fig. 78 shows the sequence of numbers in the diagonal columns of these 6×6 A primary squares, and as this arrangement cannot

1st line	1					6		a, b, or c.
2nd "		2			5			a, e, or f.
3rd "			3	4				c, d, or e.
4th "			3	4				c, d, or e.
5th "		2			5			a, e, or f.
6th "	1					6		a, b, or c.

Fig. 78.

be changed in this series, the various horizontal columns or rows in Fig. 77 must be selected accordingly. The small letters at the right

No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
a	a	b	b	c	c
f	e	f	e	a	f
c	d	c	d	d	e
d	c	d	c	e	d
e	f	e	f	f	a
b	b	a	a	b	b

Fig. 79.

of Fig. 78 indicate the different horizontal columns that may be used for the respective lines in the square; thus either a, b, or c column

in Fig. 77 may be used for the first and sixth lines, *a, e,* or *f* for the second and fifth, and *c, d,* or *e* for the third and fourth lines, but neither *b, c,* or *d* can be used in the second or fifth lines, and so forth.

Six different combinations of columns are given in Fig. 79, from which twelve different 6×6 magic squares may be constructed. Taking column No. 1 as an example, Fig. 80 shows an

a	1	2	4	3	5	6
f	6	2	4	3	5	1
c	1	5	3	4	2	6
d	6	5	3	4	2	1
e	6	2	3	4	5	1
b	1	5	4	3	2	6

Fig. 80.

1	6	1	6	6	1
2	2	5	5	2	5
4	4	3	3	3	4
3	3	4	4	4	3
5	5	2	2	5	2
6	1	6	1	1	6

Fig. 81.

A primary square made from the combination *a, f, c, d, e, b,* and Fig. 81 is the B primary square formed by reversing the direction of the horizontal and perpendicular columns of Fig. 80. The key square Fig. 82 is then made from Fig. 81 and the 6×6 magic

0	30	0	30	30	0
6	6	24	24	6	24
18	18	12	12	12	18
12	12	18	18	18	12
24	24	6	6	24	6
30	0	30	0	0	30

Fig. 82.

0	30	30	0	30	0
24	6	24	24	6	6
18	12	12	12	18	18
12	18	18	18	12	12
6	24	6	6	24	24
30	0	0	30	0	30

Fig. 83.

square in Fig. 84 is the result of adding the cell numbers of Fig. 82 to the corresponding cell numbers in Fig. 80.

The above operation may be varied by reversing the horizontal columns of the key square Fig. 82 right and left as shown in Fig. 83 and then forming the magic square given in Fig. 85. In this way two different magic squares may be derived from each combination.

It will be noted that all the 6×6 magic squares that are constructed by these rules are similar in their general characteristics to the 6×6 squares which are built up by the diagrammatic system.

Perfect 8×8 magic squares may be constructed in great variety by the method now under consideration, and the different com-

1	32	4	33	35	6
12	8	28	27	11	25
19	23	15	16	14	24
18	17	21	22	20	13
30	26	9	10	29	7
31	5	34	3	2	36

Fig. 84.

1	32	34	3	35	6
30	8	28	27	11	7
19	17	15	16	20	34
18	23	21	22	14	13
12	26	9	10	29	25
31	5	4	33	2	36

Fig. 85.

binations of numbers from 1 to 8 given in Fig. 86 will be found useful by laying out a large number of A primary squares.

1	7	6	4	5	3	2	8	a
1	2	6	4	5	3	7	8	b
1	2	6	5	4	3	7	8	c
1	7	3	4	5	6	2	8	d
1	7	3	5	4	6	2	8	e
8	2	3	5	4	6	7	1	aa
8	7	3	5	4	6	2	1	bb
8	7	3	4	5	6	2	1	cc
8	2	6	5	4	3	7	1	dd
8	2	6	4	5	3	7	1	ee

Fig. 86.

Fig. 87 shows the fixed numbers in the diagonal columns of these 8×8 A primary squares, and also designates by letters the specific rows of figures which may be used for the different horizontal columns. Thus the row marked a in Fig. 86 may be used for the first, fourth, fifth, and eighth horizontal columns but cannot

be employed for the second, third, sixth or seventh columns, and so forth.

Fig. 88 suggests half a dozen combinations which will form as many primary squares, and it is evident that the number of possible variations is very large. It will suffice to develop the first and third of the series in Fig. 88 as examples.

1st line	1						8		a, b, c, d, or e.
2nd "		2				7			b, c, aa, dd, or ee.
3rd "			3		6				d, e, aa, or cc.
4th "				4	5				a, b, d, cc, or ee.
5th "				4	5				a, b, d, cc, or ee.
6th "			3		6				d, e, aa, or cc.
7th "		2				7			b, c, aa, dd, or ee.
8th "	1						8		a, b, c, d, or e.

Fig. 87.

Fig. 89 is the A primary square developed from column No. 1 in Fig. 88, and Fig. 90 is the B primary square made by reversing

No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
a	b	c	d	e	a
aa	b	c	dd	ee	b
aa	d	cc	e	e	e
a	b	cc	d	ee	d
a	b	cc	d	ee	d
aa	d	cc	e	e	e
aa	b	c	dd	ee	b
a	b	c	d	e	a

Fig. 88.

the direction of all horizontal and perpendicular columns of Fig. 89. Substituting key numbers for the prime numbers in Fig. 90, and adding these key numbers to the prime numbers in Fig. 89 gives the perfect magic square of 8 × 8 shown in Fig. 91. The latter will be found identical with the square which may be written out directly from diagrams in Fig. 52.

Fig. 92 shows an A primary square produced from column No. 3 in Fig. 88. The B primary square Fig. 93 being made in the regular way by reversing the direction of the columns in Fig. 92.

Prime numbers 1, 2, 3, 4, 5, 6, 7, 8.
Key numbers 0, 8, 16, 24, 32, 40, 48, 56.

1	7	6	4	5	3	2	8	a
8	2	3	5	4	6	7	1	aa
8	2	3	5	4	6	7	1	aa
1	7	6	4	5	3	2	8	a
1	7	6	4	5	3	2	8	a
8	2	3	5	4	6	7	1	aa
8	2	3	5	4	6	7	1	aa
1	7	6	4	5	3	2	8	a

Fig. 89.

1	8	8	1	1	8	8	1
7	2	2	7	7	2	2	7
6	3	3	6	6	3	3	6
4	5	5	4	4	5	5	4
5	4	4	5	5	4	4	5
3	6	6	3	3	6	6	3
2	7	7	2	2	7	7	2
8	1	1	8	8	1	1	8

Fig. 90.

The perfect magic square of 8 × 8 in Fig. 94 is developed from these two primary squares as in the last example, and it will be

1	63	62	4	5	59	58	8
56	10	11	53	52	14	15	49
48	18	19	45	44	22	23	41
25	39	38	28	29	35	34	32
33	31	30	36	37	27	26	40
24	42	43	21	20	46	47	17
16	50	51	13	12	54	55	9
57	7	6	60	61	3	2	64

Totals = 260.

Fig. 91.

found similar to the square which may be formed directly from diagram No. 2 in Fig. 54.

Fig. 95 shows another 8 × 8 magic square which is constructed by combining the A primary square in Fig. 89 with the B primary square in Fig. 93 after changing the latter to a key square in the

manner before described. This magic square may also be directly constructed from diagram No. 4 in Fig. 54.

It is evident that an almost unlimited number of different 8 × 8 magic squares may be made by the foregoing methods, and

1	2	6	5	4	3	7	8	o
1	2	6	5	4	3	7	8	e
8	7	3	4	5	6	2	1	ee
8	7	3	4	5	6	2	1	ee
8	7	3	4	5	6	2	1	ee
8	7	3	4	5	6	2	1	ee
1	2	6	5	4	3	7	8	e
1	2	6	5	4	3	7	8	e

Fig. 92.

1	1	8	8	8	8	1	1
2	2	7	7	7	7	2	2
6	6	3	3	3	3	6	6
5	5	4	4	4	4	5	5
4	4	5	5	5	5	4	4
3	3	6	6	6	6	3	3
7	7	2	2	2	2	7	7
8	8	1	1	1	1	8	8

Fig. 93.

their application to the formation of other and larger squares is so obvious that it will be unnecessary to present any further examples.

1	2	62	61	60	59	7	8
9	10	54	53	52	51	15	16
48	47	19	20	21	22	42	41
40	39	27	28	29	30	34	33
32	31	35	36	37	38	26	25
24	23	43	44	45	46	18	17
49	50	14	13	12	11	55	56
57	58	6	5	4	3	63	64

Fig. 94.

1	7	62	60	61	59	2	8
16	10	51	53	52	54	15	9
48	42	19	21	20	22	47	41
33	39	30	28	29	27	24	40
25	31	38	36	37	35	26	32
24	18	43	45	44	46	23	17
56	50	11	13	12	14	55	49
57	63	6	4	5	3	58	64

Fig. 95.

COMPOUND MAGIC SQUARES.

The writer believes that these highly ingenious combinations were first devised by Prof. Hermann Schubert.

They may be described as a series of small magic squares arranged quadratically in magic square order.

The 9 × 9 square shown in Fig. 96 is the smallest of this class that can be constructed and it consists of nine 3 × 3 sub-squares arranged in the same order as the numerals 1 to 9 inclusive in the 3 × 3 square shown in Fig. 1. The first sub-square occupies the

71	64	69	8	1	6	53	46	51
66	68	70	3	5	7	48	50	52
67	72	65	4	9	2	49	54	47
26	19	24	44	37	42	62	65	60
21	23	25	39	41	43	57	59	61
22	27	20	40	45	38	58	63	56
35	28	33	80	73	78	17	10	15
30	32	34	75	77	79	12	14	16
31	36	29	76	81	74	13	18	11

Totals = 369.

Fig. 96.

middle section of the first horizontal row of sub-squares, and it contains the numbers 1 to 9 inclusive arranged in regular magic

47	58	69	10	1	12	23	34	45
57	68	79	9	11	22	33	44	46
67	78	8	10	21	32	43	54	56
77	7	18	20	31	42	53	55	66
6	17	19	30	41	52	63	65	76
16	27	29	40	51	62	64	75	5
26	28	39	50	61	72	74	4	15
36	38	49	60	71	73	3	14	25
37	48	59	70	81	2	13	24	35

Totals = 369.

Fig. 97.

square order being a duplicate of Fig. 1. The second sub-square is located in the right hand lower corner of the third horizontal row of sub-squares and it contains the numbers 10 to 18 inclusive arranged in magic square order, and so on to the last sub-square

which occupies the middle section of the third horizontal row of sub-squares, and which contains the numbers 73 to 81 inclusive.

This peculiar arrangement of the numbers 1 to 81 inclusive forms a magic square in which the characteristics of the ordinary 9 × 9 square are multiplied to a remarkable extent, for whereas in the latter square (Fig. 97) there are only twenty columns which sum up to 369, in the compound square of 9 × 9 there are an immense number of combination columns which yield this amount. This is evident from the fact that there are eight columns in the first sub-square which yield the number 15; also eight columns in

113	127	126	116	1	15	14	4	81	95	94	84
124	118	119	121	12	6	7	9	92	86	87	89
120	122	123	117	8	10	11	5	88	90	91	85
125	115	114	128	13	3	2	16	93	83	82	96
33	47	46	36	65	79	78	68	97	111	110	100
44	34	39	41	76	70	71	73	108	102	103	105
40	42	43	37	72	74	75	69	104	106	107	101
45	35	34	48	77	67	66	80	109	99	98	112
49	63	62	52	129	143	142	132	17	31	30	20
60	54	55	57	140	134	135	137	28	22	23	25
56	58	59	53	136	138	139	133	24	26	27	21
61	51	50	64	141	131	130	144	29	19	18	32

Totals = 870.

Fig. 98.

the middle sub-square which yield the number 123—and eight columns in the last sub-square which sum up to the number 231—and 15 + 123 + 231 = 369.

The next compound square is that of 12 × 12 which may be built with sixteen sub-squares of 3 × 3 or with nine sub-squares of 4 × 4 the latter arrangement being shown in Fig. 98.

The next larger square of this class is that of 16 × 16 which can only be built with sixteen sub-squares of 4 × 4. Next comes the 18 × 18 compound square which may be constructed with

thirty-six sub-squares of 3×3 or with nine sub-squares of 6×6, and so on indefinitely with larger and larger compound squares.

CONCENTRIC MAGIC SQUARES.

Beginning with a small central magic square it is possible to arrange one or more panels of numbers concentrically around it so that after the addition of each panel, the enlarged square will still retain magic qualifications.

Either a 3×3 or a 4×4 magic square may be used as a

23	1	2	20	19
22	16	9	14	4
5	11	13	15	21
8	12	17	10	18
7	25	24	6	3

Fig. 99.

23	1	2	20	19
22	12	11	16	4
5	17	13	9	21
8	10	15	14	18
7	25	24	6	3

Fig. 102.
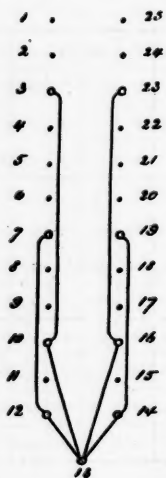
Fig. 100.
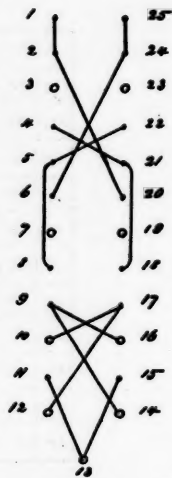
Fig. 101.

Totals of 3×3 squares $= 39$.
Totals of 5×5 squares $= 65$.

nucleus, and the square will obviously remain either odd or even, according to its beginning, irrespective of the number of panels which may be successively added to it. The center square will naturally be perfect, but after one or more panels have been added the enlarged square will no longer retain perfect characteristics, because the peculiar features of its construction will not permit the sum of every pair of geometrically opposite numbers to equal the

sum of the first and last numbers of the series used. The sum of
every horizontal and perpendicular column and of the two corner
diagonal columns will, however, be the same amount.

The smallest concentric square that can be constructed is that
of 5 × 5, an example of which is illustrated in Fig. 99.

The center square of 3 × 3 begins with 9 and continues, with
increments of 1, up to 17, the center number being 13 in accordance
with the general rule for a 5 × 5 square made with the series of

19	2	20	1	23
4	16	9	14	22
18	11	13	15	8
21	12	17	10	5
3	24	6	25	7

Fig. 103.

Fig. 104.

Fig. 105.

Totals of 3 × 3 square = 39.
Totals of 5 × 5 square = 65.

numbers 1 to 25. The development of the two corner diagonal
columns is given in diagram Fig. 100, the numbers for these col-
umns being indicated by small circles. The proper sequence of the
other twelve numbers in the panels is shown in Fig. 101. The
relative positions of the nine numbers in the central 3 × 3 square
cannot be changed, but the entire square may be inverted or turned
one quarter, one half, or three quarters around, so as to vary the
position of the numbers in it relatively to the surrounding panel

numbers. Fig. 102 shows a 5×5 concentric square in which the panel numbers occupy the same cells as in Fig. 99, but the central 3×3 square is turned around one quarter of a revolution to the right.

Several variations may also be made in the location of the panel numbers, an example being given in Figs. 103, 104, and 105. Many

Fig. 106.

Fig. 107.

Fig. 108.

Fig. 109.
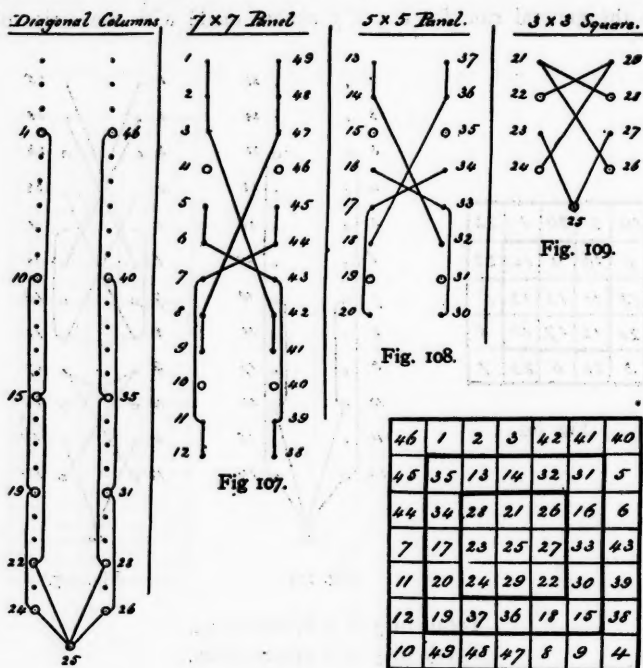
Fig. 110.

Totals of 3×3 square $= 75$
Totals of 5×5 square $= 125$
Totals of 7×7 square $= 175$

other changes in the relative positions of the panel numbers are selfevident.

One of many variations of the 7×7 concentric magic square

is shown in Fig. 110. The 3 × 3 central square in this example is started with 21 and finished with 29 in order to comply with the general rule that 25 must occupy the center cell in a 7 × 7 square
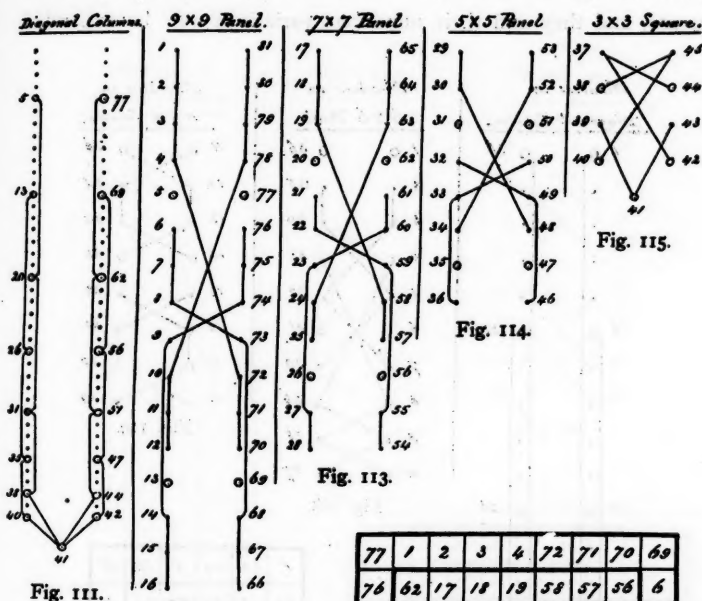
Fig. 115.

Fig. 114.

Fig. 113.

Fig. 111.

Fig. 112.

TOTALS:

3 × 3 square 123,
5 × 5 square 205,
7 × 7 square 287,
9 × 9 square 369.

77	1	2	3	4	72	71	70	69
76	62	17	18	19	58	57	56	6
75	61	51	29	30	48	47	21	7
74	60	50	44	37	42	32	22	8
9	23	33	39	41	43	49	59	73
14	27	36	40	45	38	46	55	68
15	28	35	53	52	34	31	54	67
16	26	65	64	63	24	25	20	66
13	81	80	79	78	10	11	12	5

Fig. 116.

that includes the series of numbers 1 to 49. The numbers for the two corner diagonal columns are indicated in their proper order by small circles in Fig. 106, and the arrangement of the panel numbers is given in Figs. 107, 108, and 109. As a final example of an

odd concentric square Fig. 116 shows one of 9 × 9, its development being given in Figs. 111, 112, 113, 114, and 115.

All these diagrams are simple and obvious expansions of those shown in Figs. 100 and 101 in connection with the 5 × 5 concentric square, and they and their numerous variations may be expanded

Fig. 117.

Fig. 118.

Fig. 119.

Fig. 120.

Totals of 4 × 4 square = 74.
Totals of 6 × 6 square = 111.

indefinitely and used for the construction of larger odd magic squares of this class.

The smallest even concentric magic square is that of 6 × 6, of which Fig. 120 is an example. The development of this square

may be traced in the diagrams given in Figs. 117, 118, and 119. The center square of 4×4 is perfect, but after the panel is added the enlarged square becomes imperfect as already noted. Figs. 121, 122, 123, and 124 illustrate another example of this square with diagrams of development.

Numbers in Diagonal Columns.
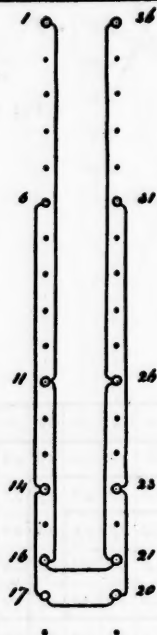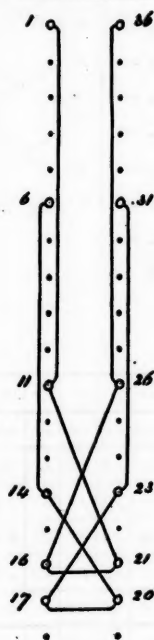
Fig. 121.

Numbers in 6 × 6 Panel.
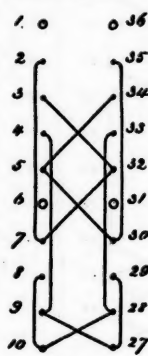
Fig. 122.

Numbers in 4 × 4 Square.
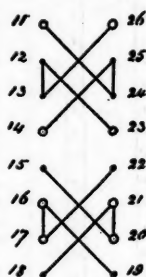
Fig. 123.

1	35	30	5	34	6
33	11	24	25	14	4
28	18	21	20	15	9
10	22	17	16	19	27
8	23	12	13	26	29
31	2	7	32	3	36

Fig. 124.

Totals of 4×4 square = 74.
Totals of 6×6 square = 111.

A concentric square of 8×8 with diagrams are given in Figs. 125, 126, 127, 128, and 129, and one of 10×10 in Figs. 130, 131, 132, 133, 134, and 135. It will be seen that all these larger squares have been developed in a very easy manner from successive expan-

sions of the diagrams used for the 6×6 square in Figs. 117, 118, and 119.

The rules governing the formation of concentric magic squares
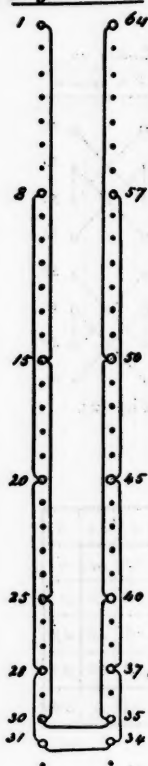
Fig. 125.
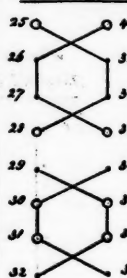
Fig. 126.

Fig. 127.

Fig. 128.

1	63	62	4	5	59	58	8
56	15	49	48	19	44	20	9
55	47	25	39	38	28	18	10
11	22	36	30	31	33	43	54
53	42	32	34	35	29	23	12
13	24	37	27	26	40	41	52
14	45	16	17	46	21	50	51
57	2	3	61	60	6	7	64

Fig. 129.

Totals of 4×4 square $= 130$.
Totals of 6×6 square $= 195$.
Totals of 8×8 square $= 260$.

have been hitherto considered somewhat difficult, but by the aid of diagrams as devised by the writer, their construction in great variety

and of any size has been reduced to an operation of extreme simplicity, involving only the necessary patience to construct the diagrams and copy the numbers.

Fig. 130. Fig. 131.

Fig. 132.

Fig. 133.

Fig. 134.
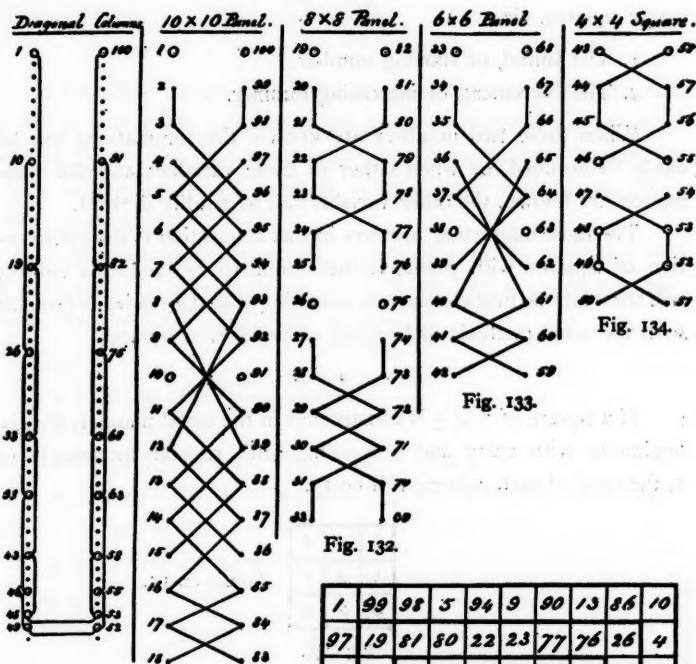
TOTALS:

4 × 4 square = 202
6 × 6 square = 303
8 × 8 square = 404
10 × 10 square = 505

1	99	98	5	94	9	90	13	86	10
97	19	81	80	22	23	77	76	26	4
6	74	33	67	66	37	62	38	27	95
93	73	65	43	57	56	46	36	28	8
12	29	40	54	48	49	51	61	72	89
87	71	60	50	52	53	47	41	30	14
16	31	42	55	45	44	58	59	70	85
84	32	63	34	35	64	39	68	69	17
18	75	20	21	79	78	24	25	82	83
91	2	3	96	7	92	11	88	15	100

Fig. 135.

GENERAL NOTES ON THE CONSTRUCTION OF MAGIC SQUARES.

There are two variables which govern the summations of all magic squares, viz.:

1. The Initial, or starting number.
2. The Increment, or increasing number.

When these two numbers are known, the summations can be easily determined, or when either of these variables and the summation are known, the other variable can be readily derived.

The most interesting problem in this connection is the construction of squares with predetermined summations, and this subject will therefore be first considered, assuming that the reader is familiar with the usual methods of building odd and even squares.

* * *

If a square of 3×3 is constructed in the usual manner, that is, beginning with unity and proceeding with regular increments of 1, the total of each column will be 15.

8	1	6
3	5	7
4	9	2

Totals = 15.

Fig. 136.

If 2 is used as the initial number instead of 1 and the square is again constructed with regular increments of 1, the total of each column will be 18 instead of 15.

9	2	7
4	6	8
5	10	3

Totals = 18.

Fig. 137.

If 2 is still used as the initial number and the square is once more constructed with regular increments of 2 instead of 1, the total of each column will be 30 instead of 18.

16	2	12
6	10	14
8	18	4

Totals = 30.

Fig. 138.

It therefore follows that there must be initial numbers, the use of which with given increments will entail summations of any predetermined amount, and there must also be increments, the use of which with given initial numbers, will likewise produce predetermined summations.

These initial numbers and increments may readily be determined by a simple form of equation which will establish a connection between them and the summation numbers.

Let:

$a =$ initial or starting number.

$b =$ increment.

$c =$ number of cells in one side of square.

$d =$ summation number when square is started with unity and built up with increments of 1.

$e =$ desired summation number.

Then:

$$(a \times c) + [(d - c) \times b] = e.$$

It will be found convenient to substitute a constant for $(d - c)$ in the foregoing equation and for this purpose a table of these constants is given below for all squares from 3×3 to 12×12.

Squares:	$(d - c) =$ Const. $=$ K
3×3	12
4×4	30
5×5	60
6×6	105
7×7	168
8×8	252
9×9	360
10×10	495
11×11	660
12×12	858

When using the above constants the equation will be:
$$(a \times c) + (K \times b) = e.$$

What initial number is required for the square of 3×3, with I as the increment, to produce 1903 as the summation?

Transposing the last equation:

$$\frac{e - (K \times b)}{c} = a,$$

or

$$\frac{1903 - (12 \times 1)}{3} = 630^{1}/_{3} = \text{Initial No.}$$

637⅓	630⅔	635⅓
632⅔	634⅓	636⅔
633⅓	635⅔	631⅓

Totals = 1903.

Fig. 139.

We will now apply the same example to a square of 4×4, in which case:

$$\frac{1903 - (30 \times 1)}{4} = 468\frac{1}{4} = \text{Initial No.}$$

465¼	462¾	481¼	471¾
479¾	473¾	474¼	476¼
475¼	477¼	478¼	472¾
480¾	470¾	469¼	483¾

Totals = 1903.

Fig. 140.

Also to a square of 5×5.

$$\frac{1903 - (60 \times 1)}{5} = 368.6 = \text{Initial No.}$$

384.6	391.6	368.6	375.6	352.6
390.6	372.6	374.6	381.6	383.6
371.6	373.6	380.6	387.6	389.6
377.6	379.6	386.6	388.6	370.6
378.6	385.6	392.6	369.6	376.6

Totals = 1903.

Fig. 141.

And for a square of 6 × 6.

$$\frac{1903 - (105 \times 1)}{6} = 299^2/_8 = \text{Initial No.}$$

299⅔	333⅓	332⅓	301⅔	330⅓	304⅔
328⅓	306⅔	326⅓	325⅔	309⅔	305⅔
322⅔	321⅔	313⅓	314⅔	312⅔	317⅔
311⅔	315⅔	319⅔	320⅔	318⅔	316⅔
310⅔	324⅔	307⅔	308⅔	327⅓	323⅓
329⅓	300⅔	302⅓	331⅓	303⅔	334⅔

Totals = 1903.

Fig. 142.

Squares built up with progressive increments of 1, have only thus far been considered. As before stated, this method can be varied by using increments greater or less than unity, but the same increment number must be used continuously throughout the construction of any given square.

EXAMPLES.

What initial number must be used in a square of 3 × 3, with increments of 3, to produce a summation of 1903?

Applying the equation given on page 578, but making $b = 3$ instead of 1, we have:

$$\frac{1903 - (12 \times 3)}{3} = 622^1/_3.$$

$622^1/_8$ is therefore the initial number and by using this in a 3 × 3 square with progressive increments of 3, the desired results are obtained.

643⅓	622⅓	637⅓
628⅓	634⅓	640⅓
631⅓	646⅓	625⅓

Totals = 1903.

Fig. 143.

To find the initial number with increments of 10.

$$\frac{1903 - (12 \times 10)}{3} = 594^1/_8 = \text{Initial No.}$$

664⅓	594⅓	644⅓
614⅓	634⅓	654⅓
624⅓	674⅓	604⅓

Totals = 1903.

Fig. 144.

Or to find the initial number with increments of $^1/_3$.

$$\frac{1903 - (12 \times ^1/_3)}{3} = 633 = \text{Initial No.}$$

635⅓	633	634⅔
633⅔	634⅓	635
634	635⅔	633⅓

Totals = 1903.

Fig. 145.

These examples being sufficient to illustrate the rule, we will pass on another step and show how to build squares with predetermined summations, using any desired initial numbers, with a proper increment.

EXAMPLES.

What increment number must be used in a square of 3 × 3, wherein 1 is the initial number and 1903 the desired summation?

Referring to equation on page 578 and transposing, we have:

$$\frac{e - (a \times c)}{K} = b = \text{Increment.}$$

or

$$\frac{1903 - (1 \times 3)}{12} = 158^1/_3 = \text{Increment.}$$

Starting therefore with unity and building up the square with successive increments of $158^1/_3$, we obtain the desired result.

1109⅓	1	792⅔
317⅔	634⅓	951
476	1267⅔	1585⅓

Totals = 1903.

Fig. 146.

When it is desired to start with any number larger or smaller

than unity, the numbers in the equation can be modified accordingly. Thus if 4 is selected as an initial number, the equation will be:

$$\frac{1903 - (4 \times 3)}{12} = 157^7/_{12} = \text{Increment.}$$

$1107\frac{7}{12}$	4	$791\frac{7}{12}$
$319\frac{7}{12}$	$634\frac{7}{12}$	$949\frac{7}{12}$
$476\frac{7}{12}$	$1264\frac{7}{12}$	$161\frac{7}{12}$

Totals = 1903.

Fig. 147.

or with an initial number of 5.

$$\frac{1903 - (5 \times 3)}{12} = 157^1/_3 = \text{Increment.}$$

$1106\frac{2}{3}$	5	$791\frac{1}{3}$
$319\frac{1}{3}$	$634\frac{2}{3}$	949
477	$1263\frac{1}{3}$	$162\frac{2}{3}$

Totals = 1903.

Fig. 148.

With an initial number of 500.

$$\frac{1903 - (500 \times 3)}{12} = 33^7/_{12} = \text{Increment.}$$

$735\frac{7}{12}$	500	$677\frac{7}{12}$
$567\frac{7}{12}$	$634\frac{7}{12}$	$701\frac{7}{12}$
$600\frac{7}{12}$	$768\frac{7}{12}$	$533\frac{7}{12}$

Totals = 1903.

Fig. 149.

With an initial number of $^1/_3$.

$$\frac{1903 - (^1/_3 \times 3)}{12} = 158\frac{1}{2} = \text{Increment.}$$

$1108\frac{5}{12}$	$\frac{4}{12}$	$792\frac{5}{12}$
$317\frac{5}{12}$	$634\frac{5}{12}$	$951\frac{5}{12}$
$475\frac{5}{12}$	$1268\frac{5}{12}$	$158\frac{5}{12}$

Totals = 1903.

Fig. 150.

It is thus demonstrated that any initial number may be used

providing (in a square of 3×3) it is less than one-third of the summation. In a square of 4×4 it must be less than one-fourth of the summation, and so on.

To illustrate an extreme case, we will select 634 as an initial number in a 3×3 square and find the increment which will result in a summation of 1903.

$$\frac{1903 - (634 \times 3)}{12} = {}^1/_{12} \text{ Increment.}$$

$634\frac{7}{12}$	634	$634\frac{5}{12}$
$634\frac{1}{12}$	$634\frac{1}{2}$	$634\frac{11}{12}$
$634\frac{1}{4}$	$634\frac{1}{12}$	$634\frac{3}{4}$

Totals = 1903.

Fig. 151.

In the case of a square of 4×4, using 1 as a starting number and 1903 as a summation:

$$\frac{1903 - (1 \times 4)}{30} = 63.3 = \text{Increment.}$$

1	887.2	823.9	190.9
697.3	317.5	380.8	507.4
444.1	570.7	634	254.2
760.6	127.6	64.3	950.5

Totals = 1903.

Fig. 152.

As a final example of this rule we will select 475 as a starting number for a 4×4 square, the summation to be 1903.

$$\frac{1903 - (475 \times 4)}{30} = .1 = \text{Increment.}$$

475	476.4	476.3	475.3
476.1	475.5	475.6	475.8
475.7	475.9	476	475.4
476.2	475.2	475.1	476.5

Totals = 1903.

Fig. 153.

Having now considered the formation of magic squares with

predetermined summations by the use of proper initial numbers and increments. it only remains to show that the summation of any square may be found, when the initial number and the increment are given, by the application of the equation shown on page 578, viz.:

$$(a \times c) + (K \times b) = e.$$

EXAMPLES.

Find the summation number for a square of 3×3 using 5 as the initial number, and 7 as the increment.

$$(5 \times 3) + (12 \times 7) = 99 = \text{Summation.}$$

54	5	40
19	33	47
26	61	12

Totals = 99.

Fig. 154.

What will be the summation of a square of 4×4 using 9 as an initial number and 11 as an increment?

$$(9 \times 4) + (30 \times 11) = 366 = \text{Summation.}$$

9	163	152	42
130	64	75	97
86	108	119	53
141	31	20	174

Totals = 366.

Fig. 155 .

The preceding equations may also be used for the construction of magic squares involving zero and minus quantities, as illustrated in the following examples.

What will be the summation of a square of 3×3, using 10 as the initial number with — 2 increments?

$$(10 \times 3) + (12 \times -2) = 6 = \text{Summation.}$$

- 4	10	0
6	2	- 2
4	- 6	8

Totals = 6.

Fig. 156.

What initial number must be used in a square of 3×3 with increments of — 3 to produce a summation of 3?

$$\frac{3-(12\times-3)}{3} = 13 = \text{Initial No.}$$

− 8	13	− 2
7	1	− 5
4	− 11	10

Totals = 3.

Fig. 157.

What initial number is required for a 3×3 square, with increments of 1, to produce a summation of 0?

$$\frac{0-(12\times 1)}{3} = -4 = \text{Initial No.}$$

3	− 4	1
− 2	0	2
− 1	4	− 3

Totals = 0.

Fig. 158.

What initial number is required for a 3×3 square, using increments of — 4 to produce a summation of 0?

$$\frac{0-(12\times-4)}{3} = 16 = \text{Initial No.}$$

− 12	16	− 4
8	0	− 8
4	− 16	12

Totals = 0.

Fig. 159.

What initial number must be used in a square of 3×3 with increments of 1, to produce a summation of — 6?

$$\frac{-6-(12\times 1)}{3} = -6 = \text{Initial No.}$$

1	− 6	− 1
− 4	− 2	0
− 3	2	− 5

Totals = — 6.

Fig. 160.

What increment must be used in a square of 3×3 wherein -5 is the initial number, and 21 the required summation?

$$\frac{21 - (-5 \times 3)}{12} = 3 = \text{Increment.}$$

16	-5	10
1	7	13
4	19	-2

Totals = 21.

Fig. 161.

What increment must be used in a square of 3×3 wherein 12 is the initial number and $-$ 12 the required summation?

$$\frac{-12 - (12 \times 3)}{12} = -4 = \text{Increment.}$$

-16	12	-8
4	-4	-12
0	-20	8

Totals = $-$ 12.

Fig. 162.

What increment must be used in a square of 4×4 wherein 48 is the initial number and 42 the summation?

$$\frac{42 - (48 \times 4)}{30} = -5 = \text{Increment.}$$

48	-22	-17	33
-7	23	18	8
13	3	-2	28
-12	38	43	-27

Totals = 42.

Fig. 163.

The foregoing rules have been applied to examples in squares of small size only for the sake of brevity and simplicity, but the principles explained can evidently be expanded to any extent that may be desired.

Professor Scheffler and others have ingeniously applied some of the curious principles of the magic square to various figures such

as triangles, rectangles, pentagons, hexagons, etc., and magic cubes of various sizes have also been constructed.

It would be outside the scope of the present article to undertake the study of these interesting problems, but any who desire to learn something about them may find a brief description of same, with a few examples, in *Mathematical Essays and Recreations* by Hermann Schubert.*

W. S. ANDREWS.

SCHENECTADY, N. Y.

* The Open Court Publishing Co., Chicago, Ill.

THE PROBLEM OF UNITY AND THE NOETIC
POWER OF THE HEART.

> "And I perceived myself to be far off from Thee, in
> the region of unlikeness, as if I heard this Thy voice
> from on high:
> "'I am the food of grown men; grow, and thou shalt
> feed upon Me; nor shalt thou convert Me, like the food
> of thy flesh, into thee, but thou shalt be converted into
> Me.'....
> "And I said: 'Is Truth therefore nothing because it
> is not diffused through space finite or infinite?'
> "And Thou criedst to me from afar:
> "'Yea verily, I AM THAT I AM.'
> "And I heard as the heart heareth, nor had I room to
> doubt, and I should sooner doubt that I live than that
> Truth is not, which is clearly seen...."
> *Confessions of Saint Augustine*, Dr. Pusey's transla-
> tion, p. 155.

THE recent discussions of the infinite, replete as they have been
with interest to both the mathematician and the philosopher,
have left quite untouched one historic aspect of the problem and
one salient characteristic of the modern definition. As this feature
has far-reaching implications in the realm of theology as well as
philosophy, and leads to a distinctly monistic interpretation of life,
The Monist seems a fitting forum in which to attempt its exposition
and analysis.

For any collection, concept, or thing to be proper object of
thought it must be unambiguous and capable of being viewed as
in some sense a whole or unit. The traditional difficulty in the con-
cept of infinite collections is how to view as a whole or unit that
which is explicitly defined as endless. There is no need to repeat

here the arguments for and against the validity of this objection. One aspect of the problem alone is pertinent to our ends.

The notion of wholeness or unity is found to imply one or all of three qualities.

1. Containing *all* of a certain class or kind of objects.
2. Excluding all of every other class or kind of objects.
3. Recognizable as in itself an individual. This recognition taking place through the individuality of the self of the thinker or knower.

The first of these qualities or attributes has reference to the interior constitution or elements of that which is viewed as a whole; the second refers to that which is exterior to the object considered; and the third has no reference at all save to the self of the knower.

The older definitions and concept of infinite assemblages obscured the first of these qualities while emphasizing the second. The numbers derivable by continued additions of one to the number *n* present an assemblage obviously infinite in the old sense. The quality of wholeness in this assemblage is imparted not by having *all* such numbers present to the view, but by the certainty that *any* such number *may* be viewed and by the definite exclusion of all other numbers or objects. As Cantor has phrased it, "it is intrinsically determined of everything in the universe, whether it is or is not an element of this assemblage."[1] Hence the assemblage though endless is still unambiguous.

But this lack of ambiguity and such unity or wholeness as the assemblage presents, is by no means derived from its endlessness. It arises from the character of the elements constituting it,—from the law of their derivation. It is the unity of this law which permits us to view the assemblage as itself a unit. It is a matter of accident, or at least of subsequent determination, whether the field of this law is infinite or finite. This dependence of the possibility of viewing an infinite assemblage as a unit upon a law connecting its elements, is of the utmost importance. Mere endlessness, without the existence of law, in no wise presents us with a definite concept,

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[1] *Acta Mathematica*, II, p. 363.

with a whole, or with a unit. In this lies the actual negativeness of the older definitions, far more than in the negative aspect of the word endless. Yet this latter is not without significance.

All definition is a matter of reference or comparison. Assuming the finite as the standard of reference, the infinite can not be derived from it save by direct negation or by the use of the very idea whose definition is sought. In the finite lies the infinite[2] as in the infinite lies the finite, but the relation between them can only be expressed either through negation or through the infinite.

The power of the modern definition lies in its recognition that the infinite can be referred only to the infinite and that every aggregation of things to be viewable as a whole or unit must have some law connecting its elements. If there be a law of self representation, the system is infinite; if there be not, it is finite. Or, to be more precise, any assemblage is infinite or finite according as there is or is not a one to one correspondence between the assemblage and a proper part of the assemblage.

Now here is the crux of the matter. In this not one infinite but *two* are defined, the infinite whole and the equally infinite part; or as Dedekind himself pointed out, and as Borel, Royce and others have ably expounded, an infinite number of infinites. The reference necessary for all logical definition is no longer between the finite and the infinite but between two infinites.

There is profound significance in the acceptance of such a procedure. It is an abandonment of the self-imposed limitation of the mind to the finite, of the one time delusion that man is a purely finite being and that all his knowledge must originate in and be referred to the finite. Once freed from this preconception, born in us by contact with matter, logical indications of the infinite character of man multiply on every side. Professor Royce has argued at length that the infinite sequence and order is the very type of the self, and the self representation of infinite assemblages has been skillfully connected with the phenomena of self-consciousness. In-

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[2] Cf. Professor Keyser's papers: "The Axiom of Infinity," *Hibbert Journal*, Vol. II, No. 3, pp. 542 and 543; and *Bulletin of the American Mathematical Society*, 2d Series, Vol. VII, No. 5, pp. 222 *et seq.*

deed it was the "thought world" of man that Dedekind used as the assemblage on which to base his "existence proof" of the Infinite. Though it has since been objected[3] that such proof was "circular" and must always be impossible as proof, the ground of this objection was not, as Mr. Russell took it, that some special axiom was covertly invoked in discussions on the infinite, but that the sense of the infinite was so deep rooted in the mind that it underlay all proof,—that it was subtly presupposed in *all* argument and to seek to prove it was as futile as to seek to prove one's own existence, that in consequence it could only be exhibited, not proved. Emerson's saying, paraphrased from most ancient writings, that in each atom the universe contrives to integrate itself, is given in this light a concreteness of meaning not seen in it before. That which is finite becomes viewed as but a determination from that which is infinite, as finite numbers are defined through infinite series. And the nature of man, through consciousness, through his power to create, through his power of self representation, is seen to be technically and literally infinite.

But though man now knows himself to partake of the nature of the infinite, he none the less but rather the more knows himself to be *one* being and no other. Though we are freed in a large part from the limitations of finiteness we are still inexorably bound by the need of unity in every object of our thought or conception. The problem of unity is no longer the problem of finiteness but is still and always must be the central problem of knowledge.

The relation between multiplicity and unity, how that which is one may be viewed as multiple, and how that which is multiple may be viewed as one, has long furnished a fruitful field of discussion and controversy; particularly since all multiplicity has been seen instantly to lead to infinite assemblages.[4] In the case of these latter it has been indicated that the unity is to be sought in the relation between the elements, in the law by which this multiplicity arises. It has been seen that the term infinite as used in mathematics is

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[3] *Hibbert Journal*, Vol. II, No. 3, pp. 547 *et seq.*; No. 4, pp. 809-812.

[4] Cf. Royce, *The World and the Individual*, Vol. I, Supplementary Essay.

properly an adjective rather than a noun,—an attribute or quality seen to pertain to certain assemblages derived and viewable as a unit from other considerations than that of their infiniteness. It has been said that mere endlessness is in no complete sense definitive, for that which is endless may yet be sharply restricted and bounded in an infinite variety of ways, each way giving rise to a different concept. But if the assemblage is unbounded, unrestricted, and endless in all ways, to the notion of endlessness we have added the notion of all-inclusiveness. The previous ambiguity no longer exists. We have reached what Mr. Russell has called the infinite of highest order, (holding in opposition to Cantor that such is possible)[5] the totality of all things of all kinds in all relations. We have passed from the mathematical adjective infinite to the old theological infinity.

However much we may be arrayed against certain of the modern mathematicians, we are certainly not departing from ancient tradition in holding that such a concept is very fundamental and intimate to human consciousness; and in agreeing with Mr. Russell that it represents a genuine totality or unit, even though Mr. Russell is himself inclined to deny the inevitable psychological and theological inferences of his position.[6] So holding, we are presented with at least one totality or unit which it is impossible to know by reference to that which is exterior to it. This brings us to an exaggerated form of a very vital aspect of the problem of unity; how are we to know, in and of itself, that which is one?

It is a very trite statement, but one which must nevertheless receive attention, that intellectual knowledge is always relative. The mind compares, relates, orders, and correlates. It weighs relations and compares things with things. The action of the mind is thus always dual-, and so many-, pointed. It can function only in multiplicity.

Yet it cannot be denied we have knowledge of things in and of themselves, such knowledge as is given to us by our senses for

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[5] Cf. *The International Monthly*, Vol. IV, No. 1, p. 95.
[6] *Vide* Mr. Russell's statement regarding the assumption of an infinite mind in his reply to Professor Keyser. *Hibbert Journal*, Vol. II, No. 4, p. 812.

example, or by the resistance to the will. Such knowledge is not one of comparison, and such reference as there is in it is directly to the knower. Therefore the distinction between knowledge of a thing in itself, and knowledge of the relations in which that thing is to other things, is a distinction known to experience as well as to metaphysics. Our problem is one of genuine significance.

In the modern definition of the infinite we have a partial answer to our question. The multiplicity necessary for definition as well as for all logical activity is there furnished by the interior structure of the thing defined, by considering the whole *and* its part. This is obviously a knowledge of the assemblage in and of itself, but it is *not* knowledge of the assemblage as a unit.

The concept of the assemblage as a multiplicity and the concept of the assemblage as a unit are entirely distinct. Though the possibility of one concept may imply the possibility of the other, yet the one concept is not the other, and knowledge of the one is not necessarily knowledge of the other. Illustrations of this distinction are easily found, for example the one used by Bolzano, the concept of a drinking glass. Viewed as a whole it is one thing, viewed as an assemblage of broken parts it is another. The first concept implies that it will hold water, the second implies no such thing. My friend is one thing, my friend *and* his indigestion quite another, though this indigestion be chronic. But there is no need of multiplying trivialities. The fact stands out sharply that the concept of unity presents the problem of knowing a thing in itself, apart from its relations to other exterior things, and apart from its relation to its own interior elements.

By the very nature of this problem such knowledge can not be derived from intellectual processes. All multiplicity has been expressly eliminated, and multiplicity as we have seen, is the fundamental requisite for all logical thought. Repugnant as it is to the pride of the intellect, flushed with the conquest of such wide realms of nature, we are yet forced to conclude that in the appreciation of a thing in itself, in *esse,* the mind is baffled: that the limits of multiplicity are also the limits of the field of logic.

But if the mind is many-pointed, the heart is single-pointed. The

action of the intellect is discursive, distributing the consciousness; the effect of love, desire and will is to concentrate and hold the consciousness upon a single object. That this retention and fixing of the consciousness results in actual knowledge has been the claim of the mystics of all ages. To this claim we may listen with the more patience once it is realized that the inner essence and individuality of each and every thing in the universe, as well as the unity of the universe itself, must remain forever unknown to us, or be known through just such a process as the concentration of consciousness resulting from love, desire, or will.

But we do not need to rely upon historic mystical perception in order to be convinced that there are genuine noetic powers of the heart. We may appeal directly to every-day experience. The knowledge and understanding springing from love and sympathy are neither remote nor hidden, but are among the most patent facts of human intercourse. In common phrase, they imply the ability to "put yourself in his place," and so to know him as he knows himself,—as an individual, neither by reference to exterior things, nor as a sum of parts, but as a unit in and of itself. Reason about a friend, and the knowledge derived is relative. We argue he is kinder than others, more unselfish, wiser perhaps. Love our friend and we perceive, not that he is kinder, but that he is kind, not that he is wiser but that he is wise. Such knowledge is not comparative but positive. In it there is reference, but this reference is wholly interior. It is to the qualities or elements of the individuality, not to anything without that individuality. As, however, the concentration of consciousness continues, even this reference disappears. We no longer view the qualities of our friend, but his individuality itself absorbs our consciousness. We know him as a unit,—as that unique something which he is to himself, and of, and in, himself.

This passage of the consciousness from qualities to inner essence is equally manifested in the contemplation of natural beauty. As we have viewed the sunlight on some distant snowclad range, rising in calm still power from gracious slopes of green, it may be the myriad tones of color, the exquisite contrasts and play of light and shade that have first compelled our notice and admiration. But

as we continue to gaze these pass from the mind. The mind itself is stilled and the consciousness of the heart awakens, wraps itself around or flows into the scene before us, is moulded into its likeness and knows its spirit and its inner meaning.

It is no reply to ask me what this inner meaning is. It escapes and forever must escape the mind, for it lies in the inner world of unities. It is felt by the heart, known by the heart, and by it the heart is uplifted. Something of peace and power and eternity for a time becomes our own. But it is not derived from reason nor can any logic prove its presence. Yet the great artists have seized and exhibited it. For as logic conveys the reference of the mind, so art conveys the perception of the soul.

What has been attempted in these illustrations is a simple description of the actual change of consciousness. The appeal of my thesis is to immediate experience. Its truth rests directly on that inner recognition and certainty which is the foundation of all knowledge, and to which it is the mission of logic to refer all things not so perceived. It is a curious psychological phenomenon that knowledge by indirection should to so many appear more certain than direct perception. In the complicated structure of formally valid reference such minds forget that that to which reference is made is *to the mind* a pure assumption. Question any scientist as to the fundamental concepts or laws of his science and he will frankly admit they are hypotheses. Question the remote logical inferences of these postulates and he will hold you in derision. Formal validity is of the mind. Truth is of the heart.

I am fully aware that in this last sentence I have exposed myself to the criticism of using undefined terms. What is Truth? I reply, I cannot say. It forever escapes definition. But its appeal I know, and it is directly to an inner feeling of certainty. It is objected that what appeals as certain to one does not so appeal to another. Perhaps this is so, I neither affirm nor deny it. Then truth is different for you and for me? Truth is individual. But truth if truth at all is universal. Truly, but so am I and so are you, yet need our universes be the same? Interpenetrating, interblending they always are, but the infinite contains within itself infinitely many

infinites, all distinct yet interblending, each individual, yet each a part, and, in definite sense, each one with the whole. So too, your universe and mine, your truth and mine, different and individual as they may be, may yet find their unity and reconciliation in a wider universe, a more inclusive truth, with which your truth and mine even now are one.

It is their reliance upon direct perception that constitutes at once the strength and weakness of all mystical philosophies: their weakness, because such perception is incommunicable; their strength because the perception of the heart brings to the individual experiencing it a depth of conviction and certainty equal to that of self existence. It is impossible to read the utterances of the great mystical teachers, from Siddartha the Buddha to the Christian mystics of France, without being impressed with the genuineness and immediacy of·experience which they record. Contrary to popular opinion it is mysticism not materialism that is the philosophy of experience. For what we *know* is that we are conscious and that there are states of consciousness. The existence of matter is an inference from the qualities of consciousness. So close to immediate experience is mysticism that it is far more properly described as a life than as a philosophy. Its answer to objectors has ever been, "Ye have ears to hear and hear not, eyes to see and see not": its plea, "Live the life and ye shall know the doctrine." Its noetic states are states of *being*.

The commonplace illustrations already given should be sufficient to recall the kind of consciousness I have described as single-pointed or directly perceptive, and which, when directed by love, results in a curious·feeling of identity between the self of the perceiver and the inner essence of the thing perceived. Born in the stillness of the mind and concerned with unity, we have seen that in this knowledge the reason has no share. Yet as a fact of experience this mysterious noetic process of the heart must take its place with other facts, forming with them a multiplicity whose relations are proper subject of curiosity and reason. But at the outset we must be prepared to demand only analogy, only an ordered assemblage of mental concepts corresponding to the facts consid-

ered,—for by hypothesis these facts include other than mental terms. Here the imagery of infinite collections may be again of service to us.

Following the path Professor Royce has made so plain, we may view each and every individual as typified by an infinite sequence, struck out by infinitely varying laws of self-representation from the infinite All. The actual individuality, unity or essence of these lies, we have seen, neither in the mere fact of their infinity, nor in any one term or sequence of terms, but in the single law by which each represents the whole.[1] In humanistic terms this corresponds to the doctrine that the true individuality of every man lies in the manner in which he mirrors the absolute. In terms of Christian theology it is that the essence of every man is his relation to God. As each assemblage represents the whole so each assemblage is self-representative in an infinite variety of ways,—one way for, and exactly corresponding to, each individual or other assemblage in the whole. Again in humanistic terms this corresponds to the statement that each man is one with his fellow man. The terms or elements of the assemblage may be variously interpreted; as experiences, temporal states, qualities, or what you will. The consciousness of the heart, dealing with unities, lies in the law of self-representation itself. The change and play of this consciousness, directed by will, consists in a change of attention or emphasis from one law of representation within the self to another. Love is the drawing power or attractive quality of life. It seeks unity with what it loves, and, when perfect, that which loves corresponds to or is one with what is loved. To impose this correspondence upon an infinite assemblage, is exactly to impose upon it the same law of self-representation as is exemplified by the assemblage to which it corresponds. The inner consciousness of the one who loves is thus in exact accord with the inner essence, meaning or unity of the one loved. The result is an identity of inner unity and an exact one to one correspondence of all elements.

The knowledge derived from reason may be likened to the step by step comparison or correspondence of the elements of the two

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[1] Cf. Professor Royce, *op. cit.*

assemblages. Quality after quality, or condition after condition is made to correspond with a like element. But the underlying fundamental law of representation or progression is never reached. For it must be remembered that no matter how great n may be, an infinite number of separate assemblages may have n terms in common. Actual and complete correspondence between the two assemblages is a correspondence between the *laws* of progression, acting at one stroke between *all* the elements. It is never realizable as a step by step verification, for this verification can never be complete. Here lies the analogy with the failure of reason to ever know the unity, the inner essence, or genuine individuality of that whose qualities it relates. To know God or man, beauty or truth, each must be loved and willed.

If this analogy be at all critically examined it will be seen that in it the *potential* is viewed as actually present. Such is indeed my view. Every thing is; and everything that is, is real. All reality is in some sense present. To the mathematician questions of reality are resolved into questions of classification. Every concept is a real concept; every fact, a real fact; every contradiction, a real contradiction; every potentiality, a real potentiality. No category, class or domain is exclusively real. Error arises through attributing to one domain that whose real existence is without that domain.

A plane triangle the sum of whose angles is greater than two right angles is as real as one whose angles equal two right angles. Yet we would be in error if we attributed the first to the domain of Euclidean Geometry. For this system is a coherent unit. Each of its axioms, postulates, or presuppositions, is a definite statement, sharply dividing reality into two classes, one consisting of those elements which obey this axiom, the other of those elements which do not. Together these definite statements determine a domain common to all, whose content the reason exposes in detail, but which is absolutely predetermined before the application of reason, and to which nothing can either be added or taken away. But Euclidean Geometry does not exhaust reality and our triangle whose angles are greater than two right angles finds its place in equally real non-Euclidean systems.

So, too, the unborn child is equally real with the growing boy. We would be in error at this time to ascribe to the first separate physical existence. For, from moment to moment, the domain of separate physical existence is sharply defined and its content predetermined. But no more than Euclidean Geometry, does present physical existence exhaust the world of reality, though, like the play of consciousness, it may in its temporal progression and in infinite time sweep over and embody all reality. To question the *reality* of any object of thought is to confuse the issue,—as well question the reality of my keys because they are not in the pocket where I first search for them. They could not be object of search were they not real.

In this view the merely possible as well as the potential have definite reality. They are present as all reality is present. Though not realized in a given state of consciousness they are present in consciousness as potential states, present even in the given state as potentialities. In the analogy of infinite assemblages, we have seen that each individual or assemblage is self-representative in an infinite variety of ways—one way for each other individual or assemblage in the whole. We have likened each law of self-representation to the state of consciousness which is knowledge of that assemblage to which this law corresponds. We may clarify the whole matter and particularly the subject of potential consciousness by a concrete illustration.

Let the assemblage of positive integers

$$1, 2, 3, 4 \ldots\ldots$$

typify the manifested whole. It is infinitely self-representative. Three such self-representations, typifying three individuals are

$$(A) \quad 2, \quad 4, \quad 6, \quad 8, \quad 10,\ldots\ldots\ldots \quad 2n$$
$$(B) \quad 3, \quad 6, \quad 9, \quad 12, \quad 15,\ldots\ldots\ldots \quad 3n$$
$$(C) \quad 5, \quad 10, \quad 15, \quad 20, \quad 25,\ldots\ldots\ldots \quad 5n$$

The individuality or inner essence of these three may be likened to the three laws of self-representation by which they were struck out from the whole and by which they progress. These are respectively $2n$, $3n$, and $5n$, where n proceeds as the whole proceeds.

The state of consciousness corresponding to the knowledge of B by A is represented by the law $3n_a$ where n_a proceeds as A proceeds. It is

$$(A_b) \quad 6, \ 12, \ 18, \ 24, \ldots\ldots\ldots$$
$$\qquad\quad | \quad | \quad | \quad |$$
$$(B) \quad 3, \ 6, \ 9, \ 12, \ldots\ldots\ldots$$

In this we see the inner essence of A, its *twoness,* determining the type of correspondence existing between it and B, determining its reaction from the external universe. The inner essence of B determines the law of self-representation within A, the selection and bringing to attention of a certain definite sequence of elements from the infinite richness of A's interior content. Another way of putting it would be the common expression that A, knowing B, vibrates in *unison* or *harmony* with B, the character of vibration is determined by B, but that which vibrates and the character of unison or harmony is determined by A, by the character of the harmony between A and the whole.

The state of consciousness corresponding to the knowledge of C by A is similarly given by the law $5n_a$ and is:

$$(A_c) \quad 10, \ 20, \ 30, \ 40, \ldots\ldots\ldots$$
$$\qquad\quad | \quad | \quad | \quad |$$
$$(C) \quad 5, \ 10, \ 15, \ 20, \ldots\ldots\ldots$$

Now obviously these noetic processes by which A knows B and C are self-representative processes within A, and whether the process A_c was ever actually performed by A or not it is always *potentially* present in A's individuality. According to our analogy therefore the knowledge of everything in the universe is potentially present in each individual thereof. Moreover there is that which corresponds to this potential knowledge in every noetic state of consciousness. That is to say, in the state of consciousness in which A knows B there is that which corresponds to the state by which he would know C. Thus within

$$(A_b) \quad 6, \ 12, \ 18, \ 24, \ 30, \ldots\ldots\ldots 3n_a$$

there is the sequence or representative system $5n_{a_b}$ where n_{a_b} proceeds as A_b proceeds

$$(A_{b_c})\quad 30,\ 60,\ 90,\ 120,\ldots\ldots\ldots 5n_{a_b}$$
$$\mid\quad\mid\quad\mid\quad\mid$$
$$(C)\quad\ \ 5,\ 10,\ 15,\ \ 20,\ldots\ldots\ldots 5n$$

Thus every noetic state contains within itself the potentiality of every other noetic state, and knowledge of the inner essence of any one thing in the universe contains in potentiality knowledge of every other thing and of the whole itself. The correspondence (6) between this potential knowledge and its object, depends both upon the inner essence of the knower (2) and the inner essence of the object (3) of the noetic state in which this potentiality is viewed $(2\times3=6)$; while its rhythm or essence (30) depends upon both these factors and also upon the inner essence (5) of its object. $(2\times3\times5=30.)$

Beyond its application to potential consciousness this illustration bears upon a very common phenomenon of affection. We are all familiar with examples where what is loved is in reality a product of the lover's imagination,—a concept and pictured individuality which has but a remote correspondence to that to which it is attached in the lover's mind. In this attachment there is obvious error. But this error and confusion of identity in no way arises from any failure or uncertainty in the noetic power of love but solely in a failure actually to love the one we call our friend. Nevertheless we have seen that, though the ideal conception alone be loved, yet in the noetic state engendered there throbs a minor rhythm genuinely, if remotely, corresponding to the object to which we mistakenly attribute the fundamental chords. This lies in the heart as potential knowledge, and I would submit that its presence there may in the midst of error constitute a deeper insight into verities than any faultless mastery of attributes can give. A text for such a thesis might well be drawn from our modern nature books, which breathe a love of all wild life, but whose anthropomorphic animal psychology is not free from criticism.

Suggestive and illuminating as it is to follow the analogy of infinite sequences along other of its manifold ramifications—into the realms of free-will and predestination, of invariance and continuity in a world of change, of distinction between terms and relations,

and of how all its possible relations lie wrapped in the nature of the term itself,—these though interesting do not here concern us. The process of the realization of potential knowledge now claims attention.

Here we are apparently confronted with two general methods of procedure. The first is the process of comparison, elimination, and generalization; the second of free conception or, as I trust will become obvious, of direct perception. These are generally considered as quite distinct. The first, being scientific in character, is supposed an act of the intellect, to which we are impelled, and whose results are determined, by the facts themselves. The other is popularly viewed as a rather purposeless and entirely arbitrary act of the imagination having little reference to facts of any kind. On examination, however, the aspect of logical necessity is found largely to disappear from the first process and the two are seen to be by no means as different as they were at first thought. For however great a part ratiocination may play in the comparison antecedent to generalization, the conception of the general law itself is never an act of reason. Always it is creative. In it there is choice, desire, will, but never logical compulsion. By it something new is born from the world of the potential to the world of the actual,—something other than, and in no legitimate sense a *consequence* of, what has preceded. For as any given set of terms are included in an infinite number of infinite sequences, so any given body of phenomena admit of an infinite variety of explanation,[a] and find their place in infinitely varied systems of potential knowledge. Nor is one of these true and all others false. As a landscape may be represented by a verbal description, a painting, or a map, so we may choose at will the type of correspondence between our concepts and phenomena.

But it is not this freedom of permitted correspondence which causes the instability and ever changing fashions in scientific hypothesis. It is an inherent weakness resident in the very nature

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[a] Cf. Poincaré, "Relations entre la Physique Experimentale et la Physique Mathematique," (*Rapports présentés au Congrès Internationale de la Physique.* Paris, 1900. Tome I, p. 1.)

of the scientific method. Its cause and origin lie wrapped in the problem of unity. Patiently, laboriously, with marvelous ingenuity, from generation to generation science has observed and related *terms*. But till the end of time such accumulating data can never reveal their inner essence. For so long as they be finite, they are not definitive. The *truth*, the general law by which they represent the whole, is not *determined* by them.

But if further observation cannot reveal the truth it may point out error. Though $n + 1$ distinct terms, as well as n, admit of an infinite number of containing sequences or functional laws, yet there are an infinite number of sequences which contain the first n terms and which do not contain the added $n + 1$st. Every new observation eliminates an infinity of previously valid possible hypotheses. But this elimination is never exhaustive and by it determination is never reached. Thus it is that generalization succeeds generalization and brilliant hypothesis gives way to hypothesis still more fertile,—each proceeds for a space in unison with the advancing sweep of recorded facts, then their orbits part.

It has often been held that mathematical induction presented a special exception to the otherwise universal impossibility of logical generalization. Such is not the case, for the two processes are totally distinct. Generalization is concerned with terms. Mathematical induction is concerned with the unity of the entire assemblage, with the *law* of its progression. In brief, proof by mathematical induction consists of this: Having given the law of progression it is shown that a certain property or quality is an invariant of this progression. If, therefore, this property is found anywhere in the assemblage it is known to be present everywhere. The unfortunate statements of this proof in mathematical text books have done much to conceal its genuine philosophic import. It is, in effect, a determination of the unchanging qualities of an individual through a knowledge of the inner essence or unity of the individuality itself. In this, reason appears as but the interpreter of the intuition, revealing the content of the concepts given it.

A review of the successive generalizations and hypotheses of science thus shows every advance to be a new, and in large part free.

conception of the creative imagination; a substitution of a unity known, because self-created, for a unity unknown but felt. Toward these conceptions we are guided by the observed facts, but in their creation there is always choice, always will,—always something expressing the human purpose and contributed from the heart of man himself. To understand the process by which the potential becomes the actual we must look to the heart and the will.

We have already seen that in the knowledge of the heart the potential is ever present. The existence of will and desire alike depend upon this presence. For desire is the yearning of the heart for what is not yet realized, and will is precisely that power by which realization is accomplished. As the essence of man is one with the essence of the whole, so, given over to the desire of his heart, man is lifted to the utmost limits of the manifested universe. Around him is the swirl and vague chaotic rush of unborn things,—formless but infinitely potent. All that is, is seen upborne by what is yet to be. So standing, as a God between two worlds, man knows himself of both. Here, in this infinite wild sweep, is the battle of his will. By it he claims his own and compels the law of his desire. By the heart of man, from the unseen is born the seen.

In the analogy of infinite sequences we have shown this to be the bringing to attention of a definite law of progression or self-representation from the infinite variety of possible self-representations. If the total nature of man, the universe of his potential consciousness, were likened to the assemblage of positive integers, the totality of known or realized realms might be represented by all the sequences $r.n$ where r is any given constant number and n takes all integral values. Then the creation of a new domain of thought could be symbolized by the forcing to attention of some hitherto purely potential system, such as the sequence of primes or the sequence of powers of r, r^n. *Present* they have always been, but in the knowledge of their *unity* something new is born. The potential has become the actual.

It is not without interest to perceive that the totality of such potential and so realizable sequences within any assemblage is of a far higher order of infinity than the assemblage itself. This fact has

distinct bearing on philosophic speculations as to the purpose of manifestation and the value of individualized consciousness, as by this it would appear that full self-realization would make the individual far other and greater than he is. Such considerations however transcend the limits of this paper.

The conclusions that I would draw from these views are as manifold and wide reaching as my subject. To one alone can I give prominence. It constitutes a twofold plea; first for the cultivation of the heart, and second for attention to its dictates. I make this plea not as a moralist, nor as a humanitarian, I can lay no claim to either, but solely as a man of science, as a lover of knowledge. To the heart ultimately all things are referred. In the depth of appreciation, in the sense of oneness with all that is, in the love of truth, in the purity of desire, and in the strength of will, must be sought the power by which alone knowledge is born. To know fully and in detail we need the keenness and precision of the trained reason, but to know at all we need some power of the heart.

And if this be granted me then I plead that the voice of the heart be not so often scouted. That which vibrates in it is in truth the song of life. We are not other than the whole. The idea we find within the heart is not set over against the universe but is its very essence, embodied in us as its image. I do not plead for blind acceptance. I plead only that to the voice of the heart we listen as to the voice of the senses. Neither lies to us. Sometimes we misinterpret each. But the test is always through the will. "Live the life and ye shall know the doctrine."

HENRY BEDINGER MITCHELL.

COLUMBIA UNIVERSITY.

THE SEMITIC CITY OF REFUGE.

AMONG the most interesting and important factors in the so-
cial development of primitive civilizations must be accounted
the right of asylum. Its precise influence is yet to be determined.
Data now accessible suggest that it may have been a factor in the
earlier stages of all races, yet may have varied greatly in its actual
contributions to progress. Its working theory seems originally to
have been that the spirits of a given locality must not be disturbed.
There was no real conception of the rights of the human individual,
no abstract ideal of liberty for man. Connected especially with
taboos and superstitions concerning blood, the right of asylum pri-
marily declares that no blood must be shed within a certain tract,
lest the local genius be enraged: hence animals as well as men are
protected. Any one who preferred to risk giving minor offense
to the deity of the place, rather than trust to the mercy of the
enemy, would quickly discover the possibility of asylum. But as
unexpected deliverances from peril impress men as profoundly as
unexpected disasters like the deluge, the fall of Sodom, or of the
kingdom of Israel, or the making of the pitch-lake of Trinidad, we
must admit that here and there places have become noted sanctu-
aries after such deliverance, just as suddenly destroyed places are
in consequence of such destruction deemed accursed. Yet we may
not assume that this order of events has been at all general in the
development of sanctuaries; we must remember that the sacred spot
is sometimes first marked by the occurrence there of some disaster,
as the abode of a spirit who must not be disturbed. Some rough
outlines of subsequent development, however, may be recognized
upon collating data now accessible.

Spencer and Gillen report such sacred spots in *The Native Tribes of Central Australia,* pp. 134 ff. No plant may be plucked therefrom, no life may be taken. The animal fleeing from the hunter is safe when it reaches the sacred tract. Chalmers and Gill report similar sacred spots in New Guinea (see *Work and Adventure in New Guinea,* 186 ff.) ; J. G. Kohl (in *Kitchi-Gami* II, p. 67) finds the institution familiar among the Ojibways in the territory of the Hudson's Bay Company. He knew of individuals who dwelt within such tracts as fugitives from justice. Among all North American Indians burial places are regarded with peculiar reverence, but perhaps this is especially marked among Northwest Coast tribes. The burial places of chieftains are to be especially guarded from sacrilege. As a consequence, private individuals and medicine men sometimes claim to be *protégés* of the spirits of the dead. In some South African tribes and in the South Sea Islands, the burial places of chieftains are asyla. In Samoa a tree at the burial place of a chieftain famous as a dispenser of primitive justice is known as an asylum for the criminal; in this case there seems to be an appeal to the spirit of the chieftain for justice. In the Kingsmill Islands each chieftain has his sacred mark or device, usually of red paint. A stranger may claim the protection of the chief and wear the same mark. This almost leaves the sacred ground idea for that of the clan totem or badge. But the sacred mark here is not tribal, it seems. Among the Afghans, the tombs of ascetics and holy persons are looked upon as places of refuge for murderers, where they may remain till the avenger of blood passes by. In most of these instances, the connection with ancestor worship is to be noticed. Among the Tshi-speaking peoples of West Africa the deity Brahfo has a sacred tract within which antelopes may not be killed. Réville tells of convents whose lands are enclosures for sacred animals, though the monks hunt and eat such animals if outside the sacred tract (*La Religion Chinoise,* p. 554). The Buddhist convent is an asylum, even for political refugees. In 1824 the Siamese heir-apparent took refuge in one from a usurper, remaining there twenty-seven years. Ancient Chinese family tombs because inviolable, are sometimes made the haunt of robbers.

In the above cases, we have relatively primitive usages. No social groups are apparent as a development of the usage. On the surface, the sanctuary would seem to be equally accessible to all. Perhaps in some of these cases the sacred tract is too small to support large numbers of people: especially if they are still in the hunting and fishing stage. Or, women may not have the right of asylum: hence a community could not easily arise. Our real interest lies in the further development.

Father A. Boscana reports that sanctuaries existed among the Indians of California. These were peculiar in that the criminal who once entered such a place was thereby purged from his guilt. He was free thenceforth to go whither he would. None might harm him. We might venture the opinion that the limited area of the sacred spot of a hunting tribe produced this modification: a hunter confined to a few acres would certainly starve. It suggests also how a sacred spot can foster the growth of a sacred class. The southern Indians being agricultural, the sacred spots become important communities. J. Adair and H. Schoolcraft report the institutions of the Creeks and Cherokees. The Creeks had "white towns" in which no violence could be done, and "red towns" or "war towns." But these do not involve clearly defined social classes. In Borneo we find further development. S. W. Tromp, in his studies of the Dutch East Indies tells us that refugee criminals colonize the sacred tracts, intermarry, remain as outcasts from all the clans, and become the agents or servants of the local sultan, a terror and a curse to the whole country. The descendants of such outcasts are themselves outcasts. Here women as well as men are clearly included in the refugee criminal classes. In Hindostan we find the same stage. The Khatties of Guzerat worship the sun, and consider themselves bound to extend the protection of the sun to every one who comes as a supplicant, so that outlaws and desperate men of every description find an asylum among them. The Kholies of Guzerat seem to have been similarly privileged outlaws, till they became intolerable to their Mussulman neighbors and were dispersed. In the Hindu Kush the Siah Posh Kafirs perpetuate a race of murderers by such sacred villages, whose lawless inhabitants

have become a scourge to the neighborhood. Joseph Wolff mentions a curious tradition of their Hebrew origin. Mary H. Kingsley (*Travels in West Africa*, p. 466 ff), reports similar sanctuary cities in the French Congo and Calabar. The refugees are not the *élite* of the land, and the simple stranger who falls among them quickly acquires unpleasantly vivid impressions of their free and easy manners. One would conclude, from such data, that gross abuse of sanctuary is a great town-builder. James Sebree reports that in olden Madagascar there were twelve great sacred towns whose protection was desirable. They were famous as the former seats of great chieftains. There also existed a "free" or privileged class, who were in reality slaves of the government. Perhaps their origin was like that of the Borneo knaves mentioned by Tromp. Both peoples are Malayan.

A. B. Ellis reports of *The Ewe-speaking Tribes of the Slave Coast of West Africa* (p. 220) that "any slave who takes refuge in a temple and dedicates himself to the service of the god cannot be reclaimed by his owner, but by paying a fee to the priests the owner can close the doors of all the temples in the neighborhood to his fugitive slaves." This case is interesting as illustrating a different trend in the development of the right of asylum. We have here, not a criminal taking advantage of the reverence for a sacred tract, but a man securing certain advantages by formal dedication to the service of a god. The particular class-development familiar in Mediæval Europe as "benefit of clergy" is apparent here. Also, we see a stage in which the effort is made to deprive certain classes of earlier rights, and the effort of priestly temple-guardians to blackmail wealthy neighbors. Perhaps a development of such sanctuary for the fugitive slave is the law among the Apingi and other West African tribes that any slave who can escape to the next village can attach himself to a new master there and be exempt from all claims of his former master. Yet this law may mean only the refusal of a captor to surrender a runaway slave. Asylum for manslaughter does not exist in these tribes.

These data are from communities still existing, or but recently extinct. As they represent tendencies in different surviving stages

of social development, we are in a position to determine more accurately the meaning of ancient institutions. We know of the right of asylum in classical literature. Roman historians have asserted that Rome originated as such an asylum (Dionysius of Halicarnassus, *Antiq. Rom.* I,15; Livy I, 8; Strabo V, 230; Plutarch, *Romulus* IX). Modern criticism has treated this statement too cavalierly, not considering the anthropological data bearing upon the right of asylum. Exploration, showing that the city is far older than the traditional epoch of Romulus, has not disproven the statement in question. Such right of asylum may have existed many centuries earlier, have been abolished and have been restored by Romulus. We shall presently consider evidence that such things actually occurred in other lands. We know that a right of asylum did exist at Rome in connection with the law of blood revenge. The latter was early abolished, and the right of asylum reserved for slaves, to offset in some measure their legal disabilities. Akin to this sanctity of a given spot was the power of the Vestal Virgin to save a condemned criminal. The same power is possessed by the Buddhist monk of Burmah to-day; but the rescued man must thereafter lead the monastic life.

The right of asylum was familiar in Greece also. Debtors, fugitive slaves, victims of unjust persecutions and violence, criminals of various types, sought refuge in such places. Even a traitor, judging from the story of Pausanias the Spartan, could avail himself of it. While the use of this right was more extensive than in Italy, important sacred communities did not spring up in either place, apparently because the sacred tracts early dwindled to the bare precincts of the temples. Elis claimed continuous peace, and the inviolability of her territory; but this was not regarded, save during the period of the Olympian festival, when the molestation of strangers within her borders was punished by fines. Yet such a legend as that of the origin of the Spartans may point to seizure of some ancient sanctuary by invading outlaws. If so, it would suggest Sparta as a quondam sacred community, such as Rome was asserted to be.

All the abuses and developments noticeable in modern com-

munities were known in ancient lands. Legal regulations and restrictions followed. Tacitus tells of them in his *Annals,* III, 60-64, IV, 14. The chief abuses considered are in connection with Oriental sacred cities, those of the West being at the time relatively unimportant. Let us say that the Roman government was applying to the East restrictions whose necessity had been realized centuries before in the West. Some of the most important Hellenistic cities of Palestine possessed the right of sanctuary, and some (e. g. Scythopolis) were on the site of older Jewish sanctuaries. But the Jewish city of refuge should be considered in connection with the other data from the Semitic field. We should inquire if the Semitic institutions appear unique, unrelated to those of the rest of the world, and if the Jewish institution is unique among the Semites.

The suggestion that whatever be the origin of a sanctuary, the development there of a sacred community will depend in part upon the ability of a community to gain a livelihood within the sacred tract, finds ample illustration among the Semites. We know that Arabian physiographic conditions caused small fertile tracts to be highly prized as peculiarly favored by some divinity. Any land flowing with milk and honey was necessarily a holy land. Other things being equal, the most fertile spot in the world would be the most sacred, a garden of Eden. Large sacred tracts would survive in the East as they could not in Italy or Greece. Various political and social movements would produce a "natural selection," however, among all these ba'al-favored districts.

Now Semitic survivals still show many large sacred tracts, as compared with the bare temple precincts respected in Western heathendom and Christendom. Burton tells us of Medina that the *haram* or sacred land is an irregular circle, ten to twelve miles in diameter, with the town in the center. All sins are forbidden within this tract, but there are different schools of interpretation. Imam Malik allows no *latrinæ* nearer than Jebel Ayr, about three miles from the town, and no slaying of wild animals. Some authorities even forbid the felling of trees, but others allow it, and it is general practice. All manslaughter, save of invaders, infidels, and sacrilegious persons, is forbidden. Drinking spirits and all sexual im-

morality are prohibited. There is a decided advance in theory, whatever be the practice, over the rude robber communities we have observed developing in other sacred tracts. The *haram* of Mekka Burton describes as extending for several hours journey on each side of the city. Legends make this sanctity of great antiquity, and exaggerated tales of it are told. Ravenous beasts and birds will not seize their prey within its limits, and big fish will not devour little ones. Abu Hanifah would not allow a murderer to be dragged out. The restrictions laid upon pilgrims during their pilgrimage illustrate the above mentioned advance in sacred theory. The name Mekka, signifying "concourse," probably originated in the meetings at the sanctuary: compare "the gathering of the tribes" of Israel. He who resides in Mekka by the Caaba is a *jâr Allah,* or protected guest of Allah. Perhaps the earliest inhabitants of the spot were refugees under the protection of a local god. We may compare the qualifications of the *gêr Yahveh* of the later Hebrew period, in Ps. xv. Robertson Smith in his *Religion of the Semites,* notices *gērim* or sojourners under temple protection among the Phœnicians. In Lecture IV, the right of sanctuary among Syrians, Arabians, and Phœnicians is remarked. Renan thinks the ruins throughout the entire valley of the Adonis indicate that it was once sacred territory. Van Lennep says (*Bible Lands,* p. 693): "With Muslims the shrines or tombs of great saints, like that of Hosein at Kerbelah near Bagdad and of Fatima at Koom in Persia, afford an asylum which is rarely violated. Superstitious veneration indeed so guards these places that a refugee can be taken only by starving him out. In Abyssinia there are five churches whose precincts are legal places of refuge." Here we see sanctuaries originating in ancestor-worship. There is no extensive tract of land, as in the cases of sanctuaries arising from ba'alism. Bent, describing Adowa in *The Sacred City of the Ethiopians,* 162 f., says: "Taking sanctuary is done by going to the porch, ringing the bell, and declaring three times in a loud voice the intention of taking refuge." The refugee is dependent upon friends for food. Even treason can claim the privilege of asylum. The cases of Joab and Adonijah suggest the contrary custom in ancient Israel. Women cannot share the right

of asylum in Ethiopia. Self-perpetuating criminal colonies cannot arise. Moreover, the sanctuary privileges of the early Church are linked with ancestor or saint-worship, rather than with ba'alism. Curtiss, in *Primitive Semitic Religion To-day*, p. 161, says that the shrine of any local *weli* or saint throughout Syria is of such sanctity that it is frequently used as a storehouse for all kinds of articles, no man daring to molest another's property and all being under the protection of the saint. This practice will explain Tobiah's use of the temple in Neh. xiii. 4-9. This protective power sometimes extends over ten or fifteen miles of land. Here we have theoretical hagiolatry, which is only ba'alism revised to suit the exigencies of Mohammedan creed. Such would be the natural inference from the large size of the *haram*. Let us turn from institutions still in existence to those of the ancient Semitic world.

Very interesting material comes from Babylonia. As it has not been previously considered in this connection, it is best to give it in full, that the reader may judge the case for himself. Hugo Winckler, in *Alt-Orientalische Forschungen*, I, p. 496 ff., offers a translation of a very interesting fragment, K. 233. In one or two crucial passages he seems to have misunderstood it. The following translation offers some amendments. The final purport of the document is not affected by the differences.

"Complaint which the Babylonians spoke before the king: When the kings our lords took their seat upon the throne, they set their faces to preserve our right of asylum, and the contentment of our hearts. And we, whoever have filled our fields, whether women of Elam, of Tabal or Ahlami, (have said) for their safety, 'Let the kings our lords establish what they have spoken.' The gods have given you a broad understanding and a liberal spirit. Babylon is a binding together of the whole (or, every?) land: it is twenty lands in one. However many enter it, its right of asylum is maintained; and 'injure one, (injure) the house of Babylon' is its name, to establish its right of asylum. A dog that enters there may not be slain.

"The kings our lords know that Eteru and his sons seized the feet of (i. e. were loyal to) the king of Aššur your father, up to

the time that Suzub son of Gahal came and slew all those who
seized the feet of Aššur [and fled?]. Those who kept the charge
of the house of their lord Suzub [carried off?] and the hands and
feet of Eteru and his sons together with....and brought (or sold?)
them in the face of (before?, or in defiance of?) my lord, and those
women whom [Sillâ] and Kuddinnu married in Babylon with them,
....that expulsion which?....of the whole house of Eteru....all
brought to....and the foreign women....and the kings our lords
from all lands....when they alter our right of asylum....[which
was established by] former kings....and in the name of Babylon
women who are [wedded] in Babylon have their right to protection
with us maintained....

"May the good deeds which the kings our lords have done to
us ascend on high. Under your shadow (i. e., protection), Bêl-
ubalht....daily prays before Marduk and Sarpanit for the kings
our lords."

Winckler rightly connects this protest with a remarkable pas-
sage in the Babylonian Chronicle, IV, 38, which records that on
the twentieth of Tebet in the first year of Samaššumukin, Bel-eter
was seized and slain in Babylon. It must have been sacrilege or a
breach of peace of the most flagrant character to thus gain a place
in the official records. But an important companion document
Winckler has not noticed. This is a letter or brief of one Zakir,
No. 702 in Harper's *Assyrian and Babylonian Letters;* 81-2-4, 77,
in the British Museum. Like the preceding, it is much broken;
but the two letters have little obscurity as to the general principles
involved. A tentative translation is offered:

"The sons of Etêru of the Sealand concerning....which the
king had placed in their care,....they received, spoke thus: 'The
word of the king....to your fathers before: They gave—? in the
presence of the king of Babylon and Ubaru thy servant, thus: Was
not that promise of the king on this wise: Whoever suddenly
[breaks into] thy city to wantonly (?) make war...to set at nought
the ancient principle that in the peace of the city of Babylon [ye
shall dwell?] the king will inform(?) his heart concerning you,
[to redeem?]....in Babylon what is established, thus: if the city

be plundered [and he is captured?]   I will hear, and I will establish his freedom.'

"Now that promise which [we heard] from the mouth of the king of lands our lord....those the king....let them put in our charge (?)....the Babylonians....and a consecrated house become heaps, the king shall redeem (them?) with money: [and fugitives?] as many as are brought from the land of Elam or the land of the Hittites he shall dedicate to Bel and Zarpanit. [And now] the dead whom the king brought to life have been sold for money: [and the] good word which the king (our) lord pledged us the hands of the king have not [performed; and Kuddinnu and] Sillâ, dwelling in Babylon he has allowed to be captured [and has not done?] as they caused to be told us. The kings (our) lords....knowing the word. As they will, so let them do. From Zakir."

Whatever obscurity is produced by the breaks, for a few of which I hazard a bracketed conjecture, certain facts stand forth clearly. This last letter mentions Ubaru as one in whose presence some pledge was given. We learn from S. 1028, Harper's [418], that Esarhaddon sent Ubaru to investigate the condition of Babylon, and Ubaru reported a general desire on the part of the new settlers of the region for the rebuilding of the city and the return of the captives. We can understand, then the reference in the above letter to "the dead whom the king has brought to life." The events, and the names of the various parties contribute to the fixing of the date. We have here again the sacrilege recorded in the Babylonian Chronicle as occurring in the first year of Aššurbanipal and Samaššumukin. We are told by these documents that Babylon protects the strangers of all lands, in the name of the gods. This right of sanctuary extends to certain surrounding fields. How large the sacred tract was we do not know; but we may recognize a reasonable basis for the marvelous stories told by Greek historians concerning the size of Babylon and Nineveh. It is quite possible that they confused in each case the size of the sacred land with that of the walled city (see the size of the *haram* of Mekka, above). Aryans, Semites, and Mongols meet on equal terms under the protection of the god: so that Babylon is a truly cosmopolitan

city—"twenty lands in one." The freedom (*duraru*) of such ref-
ugees is a result of consecration or purification (*zakutu*) to the god.
This *duraru* is of old emphasized as a sacred thing: in the Code of
Hammurabi we find this word written with the determinative for
god (*ilu*)* before it. The letter of Zakir shows that the king must
if possible redeem captives or refugees carried off from Babylon,
and consecrate them to the god. Provision for such redemption is
extremely old: we find it in the Code of Hammurabi. The Code
also contains legislation, §171, in reference to the freedom of women
married in Babylon; which may be reflected in the emphasis placed
in the first complaint above, upon the rights of all women married
in Babylon, whether foreign born or native. No violence may be
done in the sacred tract: the very dogs are protected. An injury to
a single individual is an affront to the god, a sacrilege affecting
the whole house or sacred land of Babylon. The case which pro-
vokes the complaints is that of a Sealander who had settled in Baby-
lon. The principle is said to be very ancient. These data may give
us reason to question Johns' construction of the Code of Hammurabi.
He is inclined to doubt if foreigner and native received equal rights
under Babylonian law. We observe also that Assurbanipal is pledged
to maintain the right of asylum at Babylon, and that such right of
asylum, possessed by a city, was sometimes abolished by royal
authority.

The Babylonian word which I translate "right of asylum" is
kidinutu. Delitzsch rightly recognizes it as "protection," but seems
to think of royal protection extended to a city. Winckler and Leh-
mann conjecture *Unterthanenschaft* (Lehmann, *Samaššumukin* II,
page 60). R. F. Harper, translating the Sargon Cylinder in
Assyrian and Babylonian Literature, reads "supremacy." Our docu-
ments exclude these. Babylonians would not beg to be kept subject
to Assyria, and Assurbanipal would not boast that he made the
Babylonians masters. Our connections show *kidinutu* here to be the
protection given by a city to a stranger in the name of its god. The

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*Also in Sargon XIV⁴; Khorsabad 8, and 137; *Annals* 363: cf. Brünnow
5468.

seizure and murder of Etêru the Sealander and his sons is a gross violation of sacred rights. Asurbanipal himself acknowledges the Babylonian claim as to his pledge. In Cylinder L² 10-11 and Stele S³ 47-49, he says *ilâni Bâbili ukîn kidinut Bâbili aksur*—"I established the gods of Babylon: I confirmed Babylon's right of sanctuary," adding, "that the strong might not oppress the weak." L¹ 10 and S² 29 repeat the statement. In the letter K. 84, H, 301, the king writes, "Your brotherhood (equality) with the Assyrians, and your right of sanctuary which I confirmed." He connects confirmation of *kidinutu* with the re-establishment of the gods. Later he acknowledges, in the Rassam cylinder, that the sacred land was defiled by the blood shed in his capture of Babylon. He purified the streets and pacified the enraged divinities with penitential psalms and ceremonial elegies, and with restoration of sacrifices upon the scale of olden days. That the right of sanctuary which he confirmed was not originated by him, we know from other inscriptions. Esarhaddon calls Babylon an *ali kidini* in 1 R 49, Col. IV, 18; in line 34 he says, "its *kidinutu* anew I confirmed."

We hear of other cities that possess this right of sanctuary. Sargon in his Cylinder, Bull, and Bronze inscriptions tells us that the *kidinutu* of the city of Aššur had ceased, and that he restored and confirmed it; also the *zakutu* of Harran. In the Khorsabad inscription we find a claim of the restoration of the *kidinutu* of Aššur and Harran, which had ceased. In Khorsabad 7, Sargon XIV, 3, Sargon stele I¹¹, we have reference to *sabê kidini*, people or troops under the protection of a god. These "*protégés* of the great gods" are found also in the Balawat inscription, VI⁴. The "protection of Belit" is mentioned in K. 11, 35. It is interesting to notice that the names Etêru, Kuddinnu, and Sillâ in the Babylonian complaints above translated are all derivations of roots meaning "to preserve or to protect." In a ten-column building-inscription written in the first year of his reign and published by Meissner-Rost, BAS. III, 252, Esarhaddon curses the man who shall disregard the *Kidinutu* of Babylon confirmed by the lord of lords, Marduk. In col. VII he says, *sabê kidin subarê ilu Anim u ilu Bel ilu durarsunu essis askun*—"As for the protégés of Anu and Bêl (at Babylon)

I established their sacred freedom anew." Merodach-baladan II
in col. III, 10 ff. tells us he provided lands in the cities of Nebo and
Marduk for the *sabê kidinu* of Sippara, Nippur, and Babylon.
Their ancient lands had been confiscated: he determined their bound-
aries and returned them to the *sabê kidinnu* of Babylon and Bor-
sippa, *musallim parsi*—"confirming the decrees."

Another word of interest, linked with *kidinutu* in this connection
is *zaku*. In the Babylonian complaints above translated, the man
who has been "purified" to Bel and Zarpanit is entitled to the pro-
tection of the god. Delitzsch recognizes that *zaku* means, as in
Hebrew, "to be clean or pure," but the intensive form, which is the
one in use in the connection under discussion, he translates "to set
free." This somewhat obscures the leading idea. It is true that
every sacred personage or implement, everything which is dedicated
to a god or which has touched sacred soil, acquires among Semites
as among other primitive peoples, certain exemptions, or has its
secular uses restricted. In the *Letters of Hammurabi*, published
by L. W. King, we learn that such privileges were recognized fif-
teen hundred years before the Sargonid period. Temple servants,
patesis, and royal herdsmen claim and obtain exemption from the
corvée and from military service.* Yet it is a mistake to think of
these as "chartered" or "free" in our sense. They suggest rather the
"benefit of clergy" familar in mediæval Europe. The repeated
uzakki, usually read, "I set free," in royal inscriptions seems fairly
to be "I dedicated, hallowed, devoted, or consecrated" to the god
in question; for a god is always connected with it. Exemption
from certain secular claims followed as a matter of course. Jesus
alluded to a survival of it in his criticism of the Pharisees (Mark
vii. 11). Its frequent occurrence in connection with setting aside

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* Compare Ezra vii. 24. In D. T. I, iv. R. 48, Assurbanipal mentions free-
dom from *sisitu* confirmed to Babylon, Borsippa and Nippur. Another phase
of religious exemption comes from the inscriptions of Gudea: "After I finished
his chosen temple, the temple Eminnu, I remitted penalties, I made gifts.
During seven days obedience was not exacted. The mistress became the
equal of her maid servant, the master the equal of his slave; in my city the
chief became the equal of his subject." Compare the Hebrew prophet's view
of feasts as periods of license, and J. G. Fraser's discussion of the Sacaeau
in *The Golden Bough.*

land for some god has misled Peiser. In consequence he conjectures that legalization of title is meant, and that following periods of disorder certain kings applied themselves to adjusting contested titles. We have such royal deeds, but they do not contain the term in question, unless the land is secured to some god or temple. The tenants are not exempt from tribute or rentals; they merely change landlords becoming tributary* to the god, and acquire thereby certain privileges. Besides the connection established between *zakutu* and *kidinutu* in the Babylonian complaints cited, we have Sargon's use of the terms. He speaks of the interrupted *kidinutu* of Harran and Aššur, as above cited, and in some passages he connects therewith *zakutu*, as in his Cylinder and Bull Inscriptions. In the Khorsabad inscription the *zakutu* of these cities in line 10 is linked with their *kidinutu* in line 11.

Now an examination of the inscriptions brings out two or three very significant facts. The linking of the two words is almost peculiar to the Sargonids. We are continually reminded by this last Assyrian† dynasty that they restored these rights, which had ceased to be recognized. Just as emphatically we are told of three great sacred cities so recognized: Babylon, Aššur, and Harran. We know of the effort to establish a *modus vivendi* on the part of Esarhaddon, and his division of authority, so that Aššurbanipal reigned at Nineveh, Samaššumukin as "King of Kar-Dunias" (L³,11), the ancient "garden of God"; and two other sons were assigned respectively as "Great Protectors" of the priestly fraternities of Aššur(?) and Harran. We have above proof of the readiness of these cities of refuge to protest against any infringement of their prerogatives. We have the evidence of many lands showing the readiness with

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* The ideogram for *zakû* is also ideogram for tithe or tenth. Land in various Semitic countries to-day still pays a tenth to the king. See BAS III, p. 582.

† Excepting Sennacherib. He claims no old priestly titles, as Sargon did: he does not boast of maintaining the *kidinutu* of ancient sacred cities, as do the other Sargonids. His successors must do anew what Sargon did. Sennacherib seems as radical a reformer as Hezekiah, Josiah, Henry VIII, or Juarez. The other Sargonids we must account religious reactionaries, or more conservative reformers.

which abuses of the right of asylum may develop, and the testimony
of Tacitus that Rome was compelled to serious measures in the
case of such Oriental cities. We are then able to realize that these
sacred cities formed one of the largest practical problems that con-
fronted any Assyrian king. Sargon narrates in K. 4467 his recon-
secration to Aššur of a tract of land originally set aside by Adad-
nirari, more than sixty years before. The conclusion is inevitable
that some one of the intervening kings had confiscated it. The case
is one of many now familiar in cuneiform literature, which enable
us to perceive that Assyria had its alternation of religious pro-
gressives* and reactionaries, just as Israel had. But the data at
present available show us the conflict in Mesopotamia in the array
of city against king or city against city. In Israel it is painted as
a conflict of god with god and we hear of no warring cities, save the
two capitals. But one portrayal is probably the complement of the
other. To rightly estimate the religious struggles in Israel, we may
find it necessary to consider them also as the struggles of tha mon-
archy with the pretentions of Levitical cities whose right of asylum
made them what the prophets declare them to be, centers of arro-
gance, uncleanness, and oppression; the "sojourners of Yahveh"
considered themselves delivered to do all manner of iniquity. The
destruction of the high places, the centralization of worship, would
not have been possible without the abolition of the political privi-
leges and sacred prerogatives of asylum cities. The religious in-
difference of some Hebrew kings is explicable, upon the supposition
that the monarch is concerned with such cities only so far as they
may obstruct his authority, while the prophet views their moral and
social influence. Assyria must have had similar champions of a
better order. The existence of many such privileged centers could

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* Tiglath-pileser III mentions his seizing the very cities which Sargon
later "freed," and his imposing a tribute of one tenth upon them. But for the
sake of his old and faithful palace-herald he decreed the sakûtu of the old
city of Kulbari, renamed it, and "made straight its road." So he records in a
stele in the Constaninople Museum: Scheil, *Rec. Trav.* XVI, 1894. Sargon
consecrates the city of Asur; his grandson Esarhaddon again frees it from
forced labor. Sennacherib must then have seized it as a royal possession.
So also Nebuchadnezzar I reconsecrates Bit-Karziabku, made *saku* by the
decree of a former king.

not, in the nature of the case, have been universally acceptable. There is evidence that the Esarhaddon scheme was distasteful to many, yet certain favored* oracles and religious centers rallied to its support. But the final Sargonid regime may have been reformatory, not reactionary. Confirming the right of asylum of three important ancient centers may but emphasize the abolition of such prerogatives for all others. Sargon, it is true, in various inscriptions says of Ur, Uruk, Eridu, Larsa, Zarilab, Kisik, Nimid-Laguda, and Dur-ilu, "their *ilu duraru* and their plundered gods I restored to their cities." But his successors do not seem to have perpetuated this policy towards them.

Another Sargonid word linked with *kidinutu* is *šubarû*. Esarhaddon, already quoted, speaks of the *sabê kidin* of the *šubare* of Anu and Bel. Sargon fixes the *šubarû* of various sacred towns. This is perhaps a technical term for the *haram* or cultivable land attached to each sanctuary city.

That the existence of such jealous independent centers was incompatible with any unified system of law or secular authority is apparent upon the surface.† Babylonian and Assyrian history must be considered as illustrating the same steps in social evolution that we find elsewhere. The asylum city advances through corruption and abuse to the point of judicial regulation. The right of asylum does not appear in the ancient Code of Hammurabi; but his letters show that exemptions from civil and military service for certain classes were recognized. Whether formally disallowed or not in the criminal code, as in early Rome, we cannot yet decide. Probably abuses were not yet felt. Treason may have claimed sanctuary privileges, else the asylum city could not so seriously hamper royal authority. But under the Sargonid reconstruction treason was

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* In the Sinjirli inscription Esarhaddon says that he smote the yoke of forced labor from the city of Asur at the command of the gods.

† Special privileges to sacred cities but meant heavier burdens upon others. For illustration, Tab-sil-esarra, a *saknu* of Asur, writes to Sargon in K. 5466 that the new *zakûtu* of Asur had made it impossible to raise the usual levies for the public works. Who was to do this extra labor? The curses in III R. 41 upon any one who ignores this deed to the land and presents it to any god, king, or patesi, also suggest much.

probably not accorded asylum privileges, for the Babylonians in
their protest are careful to state that Etêru and his sons were loyal
subjects to Assyria to the day of their death. The distribution of
the three asylum cities between the two great rivers is suggestive.
Palestinian geography necessitated three on each side of the prin-
cipal stream. Were Jewish reformers influenced by Sargonid
schemes?

That the Israelite city of refuge as described in Numbers xxxv
is a late institution is now generally recognized by critical students.
The judicial origin attributed to the scheme can only mean judicial
regulation; for in Exodus xxi. 13, 14, the law admits that the altar
of Yahveh is the place of asylum, while after the Deuteronomic re-
form the altar of Yahveh does not exist save at Jerusalem. All the
anthropological data introduced would suggest their development
from earlier Levitical cities, through stages of abuse and judicial
restriction. The historical cases of taking sanctuary do not con-
cern these six cities, but merely the altar of Yahveh, wherever that
was. Jewish scholars (e. g. Maimonides) have claimed that all
Levitical cities once possessed the right of asylum in some degree.
We know that of the so-called Levitical cities some were important
religious centers before the period of Hebrew domination. Of the
six "cities of refuge," at least Hebron and Shechem were noted
Canaanite sanctuaries. Another mark of readjustment is that the
haram extends but two thousand cubits from the wall of each city.
quite at variance with the large and irregular domain of the primi-
tive *ba'al* or modern *wêlî*. The restriction of the right to uninten-
tional manslayers may not go beyond the Babylonian practice: the
Code of Hammurabi deals with such matters without discussing the
asylum.

Another feature gives room for conjecture. The refugee must
remain in the asylum till the death of "the high priest." We have
seen that Babylon, Harran, and Aššur had their sacred heads, a
local *urigallu* or "great protector" or "elder brother" being at the
head of the priestly fraternities of the two latter cities. (Compare
the "sister of a god" of the Code of Hammurabi.) Is the Hebrew
regulation now misunderstood? Does it point to a time when each

Levitical city had its local sacred head, like the Mesopotamian *uri-gallu?* We do not at present know of any time limit to the protection afforded in Mesopotamia. But there may be significance in the internal disturbances connected with the accession of each Assyrian king. Esarhaddon's scheme avoided these—save for a minor disturbance at the ancient sanctuary of Nippur. Were his hostile brothers opponents of a religio-political reactionary policy?

The anthropological data showing the assembly of foreign refugees at great sanctuaries, added to the rights of the Semitic *gêr* and the practice of dedicating captives to a god, as did Mesha of Moab, cause us to wonder if the transportation policy of Assyrian kings tended to strengthen or multiply asylum cities, whose individual interests were more or less mutually opposed. A transported god, we know, was considered to be angry with his land: his protection was for the time withdrawn from his worshipers. Aššurnasirpal tells of his peopling Calah with captives, and in a great monolith inscription warns future kings not to seize Calah as a treasure house or house of captivity. The captives he has placed there one shall not confine: the royal abode must remain there; the redemption (*naptartu*) of the city shall not be violated, nor shall any camp in its midst. Heavy curses are launched against him who violates the pledges of this memorial stone. But Sargon seized it anew, and placed the captives of Bit-yokin there.

When we add to the suggestions made concerning the evolution of the Hebrew city of refuge the general fact growing ever clearer that Israelite institutions were in no small degree a remodelling of older Canaanite ones; the fact that while sacred cities in general are carefully guarded they are the prizes of great struggles, like that of the Koraysh for Mekka, of various peoples for Babylon and Jerusalem: when we add to these the fact that the ministers in control of Semitic sanctuaries are sometimes of a different tribe or clan from its patrons ,we have room for some speculations upon Hebrew origins. Were the earlier Levites Hebrews who attached themselves to local Canaanite sanctuaries and learned the ritual and manner of the god of the land? Did they gradually displace the older race till the latter became an inferior order, as in post-exilic times?

Were these post-exilic Levites in their turn "strangers who were Levited unto Yahveh" as Is. lvi. 3 may be read? Would exilic proselyting and training account for the enormous disparity in the numbers of priests and minor attendants in Ezra ii, and the remark that some were unable to show that they were Israelites? Was Yahveh known and worshiped in some Canaanite districts before the settlement of the Hebrews, as he seems to have been known in the northland in Assyrian times? Such fact, if it were established, would not conflict with Budde's theory that he was also known to the Kenites.

Take the interesting case of the Gibeonite sanctuary. This place originally must have been under the protection of Jerusalem. It chooses to ally itself with the invading Hebrews, stipulating that its sacred character be respected, and is attacked in consequence. The story in Josh. ix. 23 that the Gibeonites were immediately made very inferior temple attendants must point to their final relation to the temple at Jerusalem: for the events immediately subsequent to the invasion show that they were not scattered in Israel, nor attendants upon the tabernacle, nor connected with Shiloh, the earlier meeting-place of the tribes. They remain at Gibeon, and are locally influential. We learn that Saul attempted to exterminate them and failed. When David is warring with Ishbosheth, the forces of the rival kings meet, under Joab and Abner, at Gibeon. Is possession of that sanctuary an issue in the contest? As soon as David is master of Jerusalem, he brings up the ark, and places it, not in Jerusalem, but in a tabernacle at Gibeon, on the great high place. Is that the sanctuary where Joab and Adonijah took refuge? Some years after the placing of the ark there we find the Gibeonites able to demand and secure satisfaction for Saul's attack upon them. Yahveh is understood to be there—the Gibeonites have Saul's sons hanged before him. Later we find Absalom tries to gain the support and prestige of the old sanctuary of Hebron; Adonijah, of Zoheleth; but the successful claimant has control of Gibeon; his opening religious ceremonies are at that shrine. Is there trace here of feuds between sacred cities? Such data suggest interesting possibilities. Yahveh may have been a Gibeonite divinity. But only archæological evidence can be decisive in the matter.

Babylon's prominence as a sacred city may be parallel to that of Jerusalem. We know a long struggle between the sacred cities of the Euphrates and Tigris was terminated by an Elamite irruption which prostrated or destroyed older competitors for the hegemony. Babylon, not before in the front rank, took the leadership under the Hammurabi dynasty. Had she suffered little from the Elamites, and so acquired great religious prestige, as Jerusalem did when it escaped Sennacherib?

Whatever conclusion be reached in purely speculative matters, we may feel confident that the Semitic asylum cities are not to be distinguished in their origin and process of development from those of other races. They are characterized, however, by a far earlier development, perhaps by a more logical one; and they remain a feature and problem for a longer period, because a chief constituent of early Semitic settled life; while in other lands the sanctuary did not always reach the city stage, or, if it did, remained in most cases a secondary social feature.

In the Semitic world there is early manifest the effort to withdraw protection from criminals, and to insist upon moral qualifications for the *protégés* of a god. Glimpses of such ideas meet us in the West, as in Oedipus warned from the sacred grove of Colonus; but, broadly speaking, the West modified the institution by limiting the tract or abolishing the asylum and improving the judicial system. The Semite strove to preserve the asylum and establish some qualifications of character as prerequisite to the enjoyment of the right, while judicial procedure improved little. He who would comprehend the East must have the sacred land and the right of asylum and the qualifications of the *protégé* of a god before him at every turn of history. In Europe, the free cities as they developed had to contend with the barons, the king, and the sacred classes: in the East, the free cities were composed of the sacred classes. A certain feeling of the identity of Church and State was inevitable: the Church is the logical survival of the Semitic theory of qualifications of the inhabitant of the holy city.

Within the Semitic circle, however, historic investigation brings the early Hebrew ever closer to his kinsmen. The movements in the

valley of the Great River are repeated in no small measure in Palestine. The two ancient lands appear more and more clearly to be unconscious collaborators in the task of preparing the way for the religion of the Nazarene. A proper historical apprehension of either of the three requires our knowledge of the other two. Whatever we may understand by "the peculiar people," we cannot consider them as apart from the world, unformed and uninfluenced by the currents of ancient civilization: and when they acted as transmitters of all that was best in the many currents that flowed through them they best served the interests of the modern world.

A. H. GODBEY.

UNIVERSITY OF CHICAGO.

A MATHEMATICAL ANALOGY IN THEO-LOGICAL REASONING.

COMMENT ON DR. WILLIAM NORTH RICE'S BOOK "CHRISTIAN FAITH IN AN AGE OF SCIENCE."

IN the October issue of *The Open Court* there was a review of Professor Rice's book on *Christian Faith in an Age of Science*. The review drew attention to a mathematical illustration of what is set forth as a possible explanation of the resurrection of Christ, —not as a miracle, but as a possible instance of natural law.

The singularity of the argument attracted my attention, and having had, by the editor's kindness, an opportunity to read the work, the following additional remarks may not be out of place. So far as I can recall their statements, all writers on old style metaphysics have claimed that *moral* and *mathematical reasoning* differ wholly in their nature, and can not be applied to the same subject.

The Professor candidly states some of the difficulties which call for explanation, and he evidently accepts some of the results of the "higher criticism." In this paper I give attention only to the mathematical illustration—which if applicable at all, either proves nothing, or proves too much.

Dr. Rice gives a very good account of the way by which men have discovered and formulated a law of nature. He gives also a fair statement of the method by which mathematicians trace out curves of a simple kind; and then directly applies the same method to curves of the higher orders, where it can not possibly apply— as any one who makes the attempt will readily see. And yet this implied but erroneous application is made the basis of an argument to show that in a certain question of history, that which hitherto has

always been called a *miracle*, a contravention of a law of nature, was no miracle at all; or, at least, *might* be considered as an instance of natural law, even if a very unusual one.

So far as the x is concerned, the equation is of the third degree. This class of curves was quite fully treated by Newton, under five heads, under the name *Diverging Parabolus*.

The x in an equation of the third degree, always has three values; and these values may be equal or unequal, positive or negative,
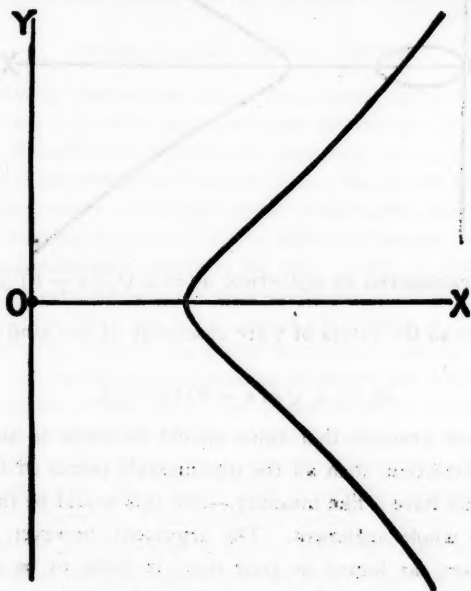
CURVE REPRESENTED BY EQUATION $ay = \pm x \sqrt{x - c}.$

whole or fractional, real or two of them may be imaginary. These different values give rise to the different curves. The particular form given by Dr. Rice requires that one value of x is zero, b and c the other two, of which b is the smaller, and it denotes the length of the oval from left to right. But b may be of any size you please; and if it is made smaller and smaller, the oval becomes less and less; and when b becomes zero, the oval is reduced to a point: i. e., when the two smaller values of x are made equal. The curve shows

a point and also the infinite branch. But when the two larger values of x are made equal, there is no oval or isolated point,—only the infinite branch. Wherefore the same equation may stand for oval or no oval, for point or no point, but always shows the infinite
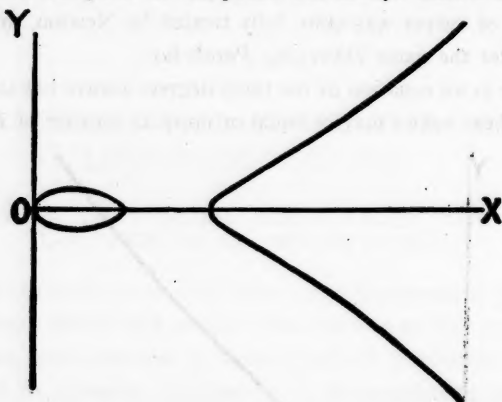
CURVE REPRESENTED BY EQUATION $ay = \pm \sqrt{x(x-b)(x-c)}$.

branch. But all the values of y are absolutely of one kind; the equation being

$$ay = \pm \sqrt{x(x-b)(x-c)}.$$

If in one example that value should be made to stand for a case of resurrection, then all the innumerable points of the infinite branch should have a like meaning,—and this would be the destruction of the whole argument. The argument, however, is wholly fallacious, and, as hinted in your note, is liable to be considered *ingeniosus quam verius*—"more ingenious than true."

R. W. McFARLAND.

OXFORD, OHIO.

CRITICISMS AND DISCUSSIONS.

SOME PHILOSOPHICAL TERMS.

It is generally admitted that one of the principal needs of philosophy at the present time is a precise and satisfactory terminology. Without such a terminology philosophers are liable to be inaccurate in presenting their own views and to misunderstand the views of others. The present diversity is due in part to the existence of different schools of philosophy, and in part to the use for philosophical purposes of several different languages, one of which, the German, has but little affinity to the rest. I have no intention now of entering on a general discussion of philosophical terms, but I wish to criticize a few of the terms now in use and to suggest a few others.

To begin with, I want to know what philosophers mean by "experience." The word is in constant use by thinkers of all schools and shades of opinion; but I have sought in vain for a clear elucidation of its meaning. I have sometimes used it myself in criticizing other writers, because they used it, and then I understood it in the vague sense which it bears in common speech and general literature. But when I tried to ascertain more precisely what those writers meant by it, I was completely balked. One school of thinkers maintains that all our knowledge is derived from experience; another school vehemently denies that, and affirms that we have knowledge independent of experience and transcending experience. From those expressions one would naturally think that experience must be a faculty, or power, of the mind, which it uses to obtain knowledge. But I cannot find such a faculty in my own mind, nor any sign of its existence in the minds of others.

Locke, who held that all knowledge is derived from experience, defined it as the observation of external objects, and of the operations of our own minds. But that is a very insufficient account of it; for, surely, feeling and action are parts of experience. When a man says that he has had experience of shoemaking, he does not mean that he has observed other men making shoes, he means that he has made shoes himself; and when I had experience of toothache, I certainly thought it was a feeling. But perhaps Locke or his followers would say that all acts and feelings that are results of observation

are parts of experience. But what criterion have they for distinguishing such feelings from those that arise from other sources? They are not entitled to beg the question and say that all acts and feelings result from observation alone. Moreover, if experience is nothing but observation, the theory that all knowledge is derived from experience is untenable; for a large part of our knowledge is the result of reasoning, and observation is not reasoning. And how about imagination? is that a part of experience? Most people, I think, would say that it is; but it is very different from observation, and contains an element which observation does not. Locke's definition is quite as obscure as the thing he undertook to define; yet I have not found any other that is more satisfactory.

Baldwin's *Dictionary of Philosophy and Psychology* defines experience as "consciousness considered as a process taking place in time." But if experience is the same as consciousness, it is a mere platitude to say that all knowledge arises from experience. Of course, all knowledge arises from consciousness; nobody ever thought otherwise. But then what becomes of the famous dispute about the origin of knowledge?

It seems to me that experience, far from being an elementary faculty or function of the mind, is a highly complex activity, and therefore that it is unphilosophical to speak of it as a primary source of knowledge. Yet philosophers and psychologists habitually use the term in that sense, and as if its meaning was perfectly well known. If some of the knowing ones will tell me what it does mean, I shall be much obliged.

Another term about which I want information is "positive," as applied to the philosophy of Auguste Comte. I have never seen a definition of it, and have not the least idea what it means, or whether it means anything. To my mind it is nothing but a proper name to designate Comte's philosophy; as if he had called his system the Parisian philosophy or the Clotilde de Vaux philosophy; and whether it had a meaning for him or not, I have never been able to find out. Of late years, too, I often meet with the term "positive science," which is just as enigmatical as "positive philosophy." Is there any such thing as negative science? If not, what does "positive" mean?

Among the philosophical terms now in use none are more common than "subjective" and "objective." Their meaning is of course too well known to require elucidation here. "Subjective" means pertaining to my thought or consciousness; "objective" pertaining to the things I think about. My mind is for me the only subject, and all other things, including other minds, are objects. These words have had a great vogue, and it has been thought that the distinction they express, and which is admitted to be important, can be expressed in no other way. Hamilton expressly says so, and he illustrates their meaning by the following example:

"Suppose a lexicographer had to distinguish the two meanings of the

word 'certainty.' 'Certainty' expresses either the firm conviction which we have of the truth of a thing, or the character of the proof on which its reality rests. The former is the subjective meaning, the latter the objective." (*Metaphysics*, Lecture 9.) Ruskin, on the other hand, declares that these are "two of the most objectionable words ever coined by the troublesomeness of metaphysicians," and that they owe their introduction to "German dullness and English affectation." (*Modern Painters*, Part 4, ch. 12.)

I confess myself strongly disposed to agree with Ruskin. I particularly object to the use of the term "subject" to denote the mind, as it is needed in a wider signification. A subject is anything that has attributes. That is the original meaning of the word, and is essentially the same as the grammatical and logical meaning. I have sometimes used the adjectives "subjective" and "objective"; but I have never liked them and have tried to find substitutes for them. A few years ago it occurred to me that the terms "noetical" and "factual" would express essentially the same distinction, and express it better and more intelligibly. "Factual" needs no explanation; it means pertaining to fact. "Noetical" from the Greek verb νοέω, to think, to have in mind, means pertaining to thought or to consciousness in general. The latter term is not quite synonymous with "subjective" which means pertaining to my thought only, "noetical," pertaining to any body's thought; but I maintain that the latter meaning is much the more important. In the example given by Hamilton "noetical certainty" is our firm conviction of the truth of a thing, "factual certainty" the character of the proof on which its reality rests. Other examples might be given. In ethics, for instance, an act may be wrong though the agent thinks he is doing right, and in such cases we all agree that the agent is blameless. Such an act I call "noetically right" but "factually wrong"; and these terms express the distinction far better than "subjective" and "objective" do. So in the Greek language the negative ου is factual, μη noetical, and the same distinction appears in the Greek moods. I commend the terms here suggested to the attention of thinkers and writers.

Another philosophical term in common use for which I have no affection is "esthetics" as a name for the science, or philosophy, of beauty and the ideal arts. This meaning of the word is not in accordance with that of the Greek word from which it is derived, which meant sensation or sense-perception, and had no relation to beauty. It is an ill-sounding word too, and this is still more true of some of its derivatives, especially "esthetician." The proper name for the science of beauty is "calonomics," formed on the analogy of "economics" from καλός and νομικός. The Greek word νόμος does not denote what we call a natural law, or law of nature. It means a rule, norm or standard to which we ought to conform, and hence is specially fitted to use in naming a normative science, which the science of beauty admittedly is.

The same etymology gives the adjective "calonomic," which will enable us to distinguish the kalonomic arts from the economic arts; and we can also form a personal noun "calonomist," like "economist." I doubt if I ever have occasion to use these terms myself, and perhaps others may not think them worth having; but they are at least worth considering.

I have another word to suggest of much greater importance than any of the preceding. English philosophical writers have often felt the need of a word to designate the intuitive element in perception. Locke used "sensation" for that purpose, but he also used it in other senses, thereby causing great confusion. Reid employed "perception," distinguishing it clearly from "sensation." But "perception" includes an element that is not intuitive. When I perceive the table before me, I not only perceive the thing, but also perceive that it is a table; and that involves the general idea of a table which I have acquired by generalizing from previous observations.

The Germans, as is well known, have a word for the very purpose in question, namely, *Anschauung*. I am not a German scholar; but I know the meaning of *Anschauung*, and have noticed the difficulty which English writers have had in translating it. I have read two lives of Pestalozzi, in one of which that word is rendered "sense-impression," and in the other "sense-perception"; both of which are wrong. The former is the worst, for *Anschauung* is an act, not an impression. Meiklejohn, in his translation of Kant, called it "intuition," and Max Müller called it "perception," neither of which is correct. Yet the word they wanted had been in the English language for three centuries, as it had previously been in the Latin language, and I am surprised that none of them had the wit to find it. The word I mean is "aspection." This word, with the verb "to aspect" and other cognates, was often used by English writers of the seventeenth century, but for some reason they have all passed out of use except the noun "aspect," which everyone knows. The following definitions and quotations, which I take from Dr. Murray's *English Dictionary*, will show how these words were used in the seventeenth century.

Aspect: To look at, behold, survey, watch. Gwillim, 1610: "As if they were worn by two persons aspecting, or beholding, each other." Dareil, 1625: "Those which aspect the beames of the sunne think a long time after they behold still a sunne before their eyes."

Aspection: The action of looking at, beholding, viewing. Sir T. Browne, 1646: "That this destruction should be the effect of the first beholder or depend upon priority of aspection."

Aspectable: Capable of being seen, visible. Raleigh, 1614: "God was the sole cause of this aspectable and perceivable universal."

Besides the three forms above given there is an adjective "aspectual," which will be useful in philosophy and psychology from its resemblance to

"perceptual" and "conceptual," and several other adjectives. Adverbs, which are not given in the Dictionary, can be readily formed from the adjectives, and there is a personal noun "aspector."

I propose to revive all these words for philosophical purposes. In a work on the elements of philosophy, which I have begun to write, but may never be able to finish, I am using "aspection" to denote the intuitive element in perception, defining it as the immediate knowledge of concrete things, whether those things are external or internal, material or mental. The word is the more necessary to me because I maintain the doctrine of natural realism, and could not express my views properly without it. I first thought of the word about twelve years ago, and did not know then that it had ever been used in English. I speak of aspection by touch and all the other senses as well as by sight, and also of self-aspection, which is the same as introspection. spection.

The Germans use *Anschauung* to denote the aspection of an object by the "mind's eye" in imagination; but, if we are to follow their example, we ought to call that act imaginative aspection, and not confound it with anything so radically different as real, or intuitive, aspection. The Germans use the term *Weltanschauung* to denote the view of the world and its properties which a philosopher forms for himself. But that term is not strictly correct, for a philosopher's view of the world is partly the result of reasoning, and therefore contains an element of conception. Nevertheless, "world-aspection" has a vividness which "world-conception" has not, and, if properly understood, there is no objection to its use.

It seems to me that the importance of this group of words for philosophical purposes can hardly be overestimated, denoting, as they do, one of the most important faculties and functions of the human mind, and one for which we have hitherto had no name in English. And philosophers will not be the only persons to profit by them; writers on science, art, and education can use them also. They can be used in French and Spanish as well as in English, but not, perhaps, in Italian, which employs *aspettare* with the meaning of watch for, or wait for. In time, I hope they will all become a part of the popular speech.

<div align="right">JAMES B. PETERSON.</div>

DIFFICULTIES IN PHILOSOPHICAL NOMENCLATURE.

Mr. James B. Peterson's communication on "Some Philosophical Terms" is very suggestive and contains valuable hints. His propositions concerning *Anschauung* and esthetics we deem especially worthy of consideration.

As to his complaints concerning the apparent carelessness prevalent in the use of the terms experience, subjective and objective, and positive, we

would call his attention to the fact that the difficulties of these very terms, their drawbacks and their advantages, have been repeatedly discussed in detail in several publications of the editor of *The Monist.* We have pointed out the wrong uses to which they have been subjected and stated our own interpretation of them without having as yet met with any criticism that might induce us to change our views.

The term "experience," as used in the popular sense, means the practice of an expert, and not mere observation nor purely "consciousness" which is quoted as its philosophical definition. Yet the philosophical use of the word is nearer the popular notion of it than Mr. Peterson might be inclined to think. Kant identifies it with the result produced by sense-impressions upon the organism of any sentient being. Though the experience of a shoemaker in making shoes is somewhat different from experience as a philosophical term in which sense it denotes the basis of all possible knowledge that appears in the range of consciousness, the process is fundamentally the same. Reactions upon sense-impressions are various sensations of functions which harden into habits, and the comparison of different sensations finally produces consciousness.

That experience is an active process and not a mere passive attitude has been recognized by neo-Kantians such as Wundt, and will be conceded even, I believe, by those who have not insisted on it.

Mr. Peterson says that "all knowledge arises from consciousness" and he thinks that "nobody ever thought otherwise." But his statement is more than doubtful, for it would be easier to argue for the reverse and to say that consciousness arises from knowledge; more explicitly, that consciousness is simply a mental state in which feeling reaches such a high degree of intensity that it can be produced only by a wealth of classified perceptions which have been stored up in the shape of memories, and thus allow a comparison between the present and past states of mind. Consciousness is not a faculty but a function, and as a function it deserves its name only when a certain intensity has been reached.

The term "positive" is not, in my opinion, an adequate description of Comte's philosophy which as a philosophy might rather be called negative, since it denies the right of philosophy to solve properly philosophical questions and would limit its domain to a mere hierarchy of the sciences. The subject has been treated in a discussion with Mr. Louis Belrose, Jr., an adherent of Comte's philosophy in *The Monist*,[1] and the same subject is dealt with in the author's *The Surd of Metaphysics*.[2]

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[1] Belrose, "Defence of Littré," II, 403.—Carus, "Emile Littré's Positivism," II, 410.—Schaarschmidt, "Comte and Turgot," II, 611.—Belrose, "Comte and Turgot," III, 118.

[2] See Index, *s. v.* "Comte."

Ruskin is apparently so little conversant with philosophical literature that his condemnation of the terms subjective and objective which he puts down to "German dullness and English affectation," may fairly well be ignored. The terms are quite appropriate and, we might add, indispensable in philosophy. At any rate, no other terms have as yet been invented to take their place. Mr. Peterson's proposal to replace them by "noetical" and "factual" would be acceptable only in a limited sphere of their application. The term "noetical" can apply only to thinking beings endowed with mind. It refers to thinking processes only, while "subjective" denotes the inner aspect of anything in its contrast to the surrounding world. The amoeba does not think; it would be a misapplication of the word to speak of noetic processes taking place in its amoeboid soul, and yet there is a certain something going on in the feeling of the amoeba which is analogous to the psychic processes of man. It is not noetic but subjective. If a better term than subjective can be invented, let us have it, but noetic is decidedly insufficient.

"Factual" means obviously anything that belongs to the domain of facts, a thing or event that is real, or unquestionably existent. And what is more factual than the existence of consciousness, the main phenomenon of subjectivity? Moreover, noetic processes take place in all thinking beings and can be observed and described as processes of the objective world like the processes of physiological functions and the motions of material bodies. Thus the terms noetical and factual would not cover the same ground, nor do they form the same contrast as do subjective and objective.

The contrast to factual is "imaginary" or "illusive," while the contrast to noetic should rather be "sensory," i. e., the raw sense-material which noetic processes work out into knowledge.

The difficulties in regard to the term *Anschauung* have received especial attention in the columns of *The Monist*, and we have proposed to translate it by the neologism "atsight," coined after the analogy of foresight and insight, and denoting, in opposition to insight, the act of beholding or sighting external objects, with which a thinking being is confronted. That the meaning of atsight should not be limited to the sense of sight is a matter of course which is equally true of the German *Anschauung*, and also of Mr. Peterson's "aspection." Such widening of terms is quite in keeping with the philological spirit of all languages and need not be defended here. But we must admit that Mr. Peterson's proposal to introduce the term "aspection" appeals to us, although it would need as much explanation as the other translations of *Anschauung*: intuition, atsight, perception, etc.

Mr. Peterson's statement that intuition is a wrong translation, is scarcely tenable. He should have said that our present use of the term interferes with its original and proper application which is the sense in which Kant uses the term *Anschauung*. Far from being wrong, the word intuition is the original

term which German philosophers have translated by *Anschauung*. The Latin *intueor* means "I behold," and *intuitio* is the act of beholding. This is the sense in which the word is used by Kant and Kantians, and those readers of Meiklejohn's translations who know Kant's usage of the Latin *intuitio* will have no difficulty in understanding the term correctly.

Unfortunately, mystics misapplied the term intuition. They cherished the fond hope of a visionary knowledge which should be as direct and immediate as sense-perception, unincumbered with the complication of our noetic processes. Prophetic minds should be able to behold the truth at a glance and comprehend the most intricate problems of life by immediate perception, as in the darkness a landscape with all its most intricate details may be suddenly revealed to our eyes by a flash of lightning. This mystical beholding of truth being called by the Latin name intuition, we have proposed, in analogy with the Teutonic *Anschauung*, to introduce a Saxon term for the concrete act of beholding real things.

One more point: It seems strange that so many philosophers neglect the establishment of a philosophical terminology, and Mr. Peterson trusts that he will be able to create one that would at least do away with the technical difficulties connected with the meaning of terms. But we fear that no attempt at establishing a terminology acceptable to all schools would be successful, for the sole reason that each terminology reflects a particular philosophy. The introduction and acceptance of a certain terminology will necessarily, we might almost say mechanically, influence thinking minds and force them into a definite conception of the world. If this be the correct view, it will be an advantage, but there are still differences of opinion on that subject. The acceptability of certain contrasts implies an acquiescence in their legitimacy. The contrast between objective and subjective, for instance, involves a great many philosophical conclusions which many people of a dualistic bent are not inclined to concede, and the acceptance of these two terms implies in fact the acceptance of monism, for the very conception of the contrast recognizes the oneness of two opposites and conceives their duality as being due to a difference of aspect.

Accordingly we believe that all attempts at establishing a commonly accepted terminology will fail, until we have realized the ideal of a philosophy of science,—a philosophy which would be a science as much as mathematics, chemistry, and physics. That this is possible we do not doubt. We have insisted on its feasibility and offered our own solution for many years, ever since the first appearance of *The Monist*.

EDITOR.

DEFINITION OF GOD.

It is always more easy to criticize the work of another than to improve upon it. Hence it is with some diffidence that I make these remarks upon the definition of God contained in the article "Definition of Religion" in *The Monist* for October, 1904. Nevertheless that definition that "God is the highest authority for moral conduct" appears to me so far from the truth that I feel compelled to protest against it.

The Christian idea of God is derived from the Bible. Here we first meet it in the form of a powerful being represented as creating the heaven and the earth, plants, animals, and men. This idea was never given up by Jews or Christians. Jeremiah represents God as saying, "Before I formed thee in the belly, I knew thee," and Jesus says, "If God so clothe the grass of the field etc., shall he not much more clothe you?" It is evident, therefore, that the idea of God as Creator is an essential part of the God-idea in Christianity. It is also a part of the idea of God in Mohammedanism, *vide* Koran, chap. iv: "O men, fear your Lord, who hath created you out of one man, and out of him created his wife, and from them two hath multiplied men and women." The same idea occurs in Hinduism, where God is called Brahma, the Creator, and by other names as Jaganath, Visvesvara, etc. with a similar signification.

It appears to me on analyzing the popular conception of God that it may be resolved into two distinct portions. The first is the idea of God as Creator and sustainer of all things. This idea is prominent in Old Testament theology, in Mahomedanism, in Brahman and Saivite Hinduism, in the Persian religion, and in many others. But a second idea is also sometimes present. This is the ethical ideal. In some religions these two ideas are combined; in others they are kept separate. They are combined in Christianity, where Jesus, the ethical ideal, is confused with Yahveh, the Creator. They are combined in Vaishnava theology, where Vishnu, the ruler of the world, is confounded with his incarnations Krishna and Rama. But they are separate in Buddhism, where Buddha is worshiped (if at all) as the ethical ideal, while the first idea of God as Creator is omitted and denied. But it must be noted that the idea of God as Creator is found in Thibetan Buddhism where Siva takes the place occupied by Yahveh in the Christian Trinity.

Thus it is possible to divide religions into three classes, (*a*) where the idea of God as Creator predominates, as in Judaism, Mahomedanism, Zoroastrianism, Brahmanism, Saivism, etc.; (*b*) where the idea of God as the ideal man prevails, as in Buddhism; and (*c*) where these two ideas both exist and coalesce, as in Christianity, Thibetan Buddhism, and Vaishnavism. It should be observed that as a real man is preferable to an ideal one as a model for imitation, so those religions which conceive God as an ideal man

always represent him in the form of a real one, as Christianity (Jesus) Buddhism (Gautama), and Vaishnavism (Krishna and Rama).

It should also be remarked that the founder of each religion is always considered the real highest authority for moral conduct. Thus Moses was the highest ethical authority for the Jews, Jesus for the Christians, Mahomet for the Mahomedans, and Gautama for the Buddhists. Nevertheless only Jesus and Gautama Buddha have been worshiped as God, and primitive Christians and primitive Buddhists did not do this. The worship of the supreme ethical authority, or moral ideal as God is a corruption therefore, and not true religion. From all of which it is evident that the idea of God as Creator is the essential one to religion, and the idea of God as perfect man and supreme moral authority is a secondary one and not sanctioned by the highest religious authorities.

It may be objected that the prophets Moses, Jesus, and Mohamet always ascribed their moral doctrines to God, and that therefore we should do so likewise. But this is not altogether true. Each prophet ascribed his call to God, and claimed the sanction of God to his doctrines, but not much more. Jesus used to say, "It was said of them of old time so and so, but *I* say unto you so and so." Obviously therefore he was his own supreme ethical authority. This is even more apparent in the case of Gautama Buddha. Mahomet also altered his precepts from time to time according to circumstances, which he would not have done had he believed them to be divine. Therefore we must suppose that the supreme ethical authority of the prophets was not God, but the opinion held by each as to what course of conduct was best for his followers and the human race. Surely then it must be evident that the idea of God as Creator is the most important one.

ROBERT C. COCKERILL.

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BOOK REVIEWS.

MASS AND CLASS. A Survey of Social Divisions. By *W. J. Ghent*. New
York: The Macmillan Company. London: Macmillan & Co., Ltd.
1904. Pp. ix, 260. Price, $1.25.

Some time ago Mr. W. H. Mallock published a book on *Classes and
Masses*, which, however, according to the opinion of Mr. W. J. Ghent, does
not do justice to the subject. Mr. Ghent says of Mr. Mallock: "His argument
and illustration are confined solely to an attempt to prove the interesting
assumption that out of the modern increase of wealth in Great Britain the
'working classes' have received an altogether disproportionate share."

In contrast to Mr. Mallock's book our author proposes the result of his
own investigations which he characterises as follows: "In my present work
I have sought to analyse the social mass into its component classes; to de-
scribe these classes, not as they may be imagined in some projected benevolent
feudalism, but as they are to be found here and now in the industrial life of
the nation; and to indicate the current of social progress which, in spite of
of the blindness of the workers, the rapacity of the masters, and the sub-
servience of the retainers, makes ever for an ultimate of social justice."

The author divides all classes of those directly concerned with production,
distribution, exchange, and service, into six groups to the exclusion of non-
wage-earning women and children. These six classes are (1) proletarians
or wage-earning producers, (2) self-employing producers, among whom the
land-holding farmers and handicraftsmen are the most important ones, (3)
social servants, (4) traders, (5) idle capitalists, and (6) retainers whose
occupations consist in contributing to the comforts and interests of capitalists,
traders, etc.

The most important parts of the book are chapters 7 and 8 on "The
Reign of Graft," which contain our author's accusations of the present state
of conditions, "an inescapable result of individualist competitive industry."
Many of the evils pointed out in these chapters are no doubt based on jus-
tice, but we cannot help thinking that the author is strongly biased by his
preconceived notions of a one-sided social ideal. He concludes his book with
these words:

"Slowly among the victims arises a sense of the injustice, the chaos, and the waste of this practice; and more slowly, but still surely, the determination to be rid of it; to apportion, upon equitable terms, the common burdens, and to distribute, in equitable shares, the common hoard. That determination is the growing and expanding will of the producing classes, and its fulfilment will be the co-operative commonwealth."

AN OUTLINE OF THE THEORY OF EVOLUTION, With a Description of some of the Phenomena which it Explains. By *Maynard M. Metcalf.* New York: The Macmillan Co. 1904. Pp. xvii, 204. Price, $2.50 net.

The author, Maynard M. Metcalf, is professor of biology in the Woman's College of Baltimore, and the present book incorporates a series of lectures which he gave before a number of visitors who had expressed a desire to attend, as well as the students in his classes. For this reason the lecturer has especially endeavored to avoid technicalities as far as possible, treating the subject in a popular way and supplying a great part of information by means of illustrations. In fact we may say that the illustrations of the book are its most important feature, and the author has purposely selected them from the best scientific sources, in the hope that his students will thus be encouraged to study up the subject more carefully in the expositions of those prominent writers who have been the chief contributors to the development of this most significant branch of science. The style of the lectures is easy and fluent, and the illustrations (some of which are in colors, especially those referring to mimicry) are not only instructive but elegant as well.

AN INTRODUCTION TO THE PHILOSOPHY OF HERBERT SPENCER. By *William Henry Hudson.* Issued for the Rationalist Press Association, Ltd. London: Watts & Co., 1904. Pp. 128.

This booklet contains a biography of Spencer. It contains a review of Spencer's early work preparatory to his main theme, an exposition of the *Synthetic Philosophy*, a condensed statement of the *First Principles*, the *Principles of Biology* and *Psychology*, a sketch of Spencerian sociology, a summary of his ethics, and finally the religious aspect of his philosophy. The appendix contains a list of Spencer's works. This book, which makes no claim of offering anything new, may be useful to those who are not familiar with Spencer's theories. It is adorned with a picture not of Mr. Spencer but of his interpreter, Mr. Hudson.

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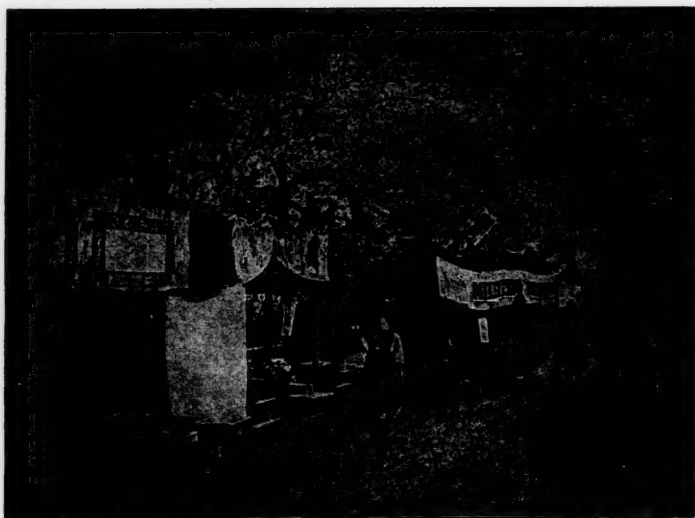
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> Loving because I must;
> Doing for the joy of it.

Some one who has "entered in" sends back to us this inspiring prayer book, and to seize its spirit and walk in the light of it would still the moan and bitterness of human lives, as the bay wreath ends the toilsome struggle in the hero's path. Measure the height attained in this one reflection for the weary army of the unsuccessful: "He is to rejoice with exceeding great joy who plucks the fruit of his planting, but his the divine anointing who watched and waited, and toiled, and prayed, and failed—and can yet be glad." Or this, in exchange for the piping cries of the unfortunate: "I do not bemoan misfortune. To me there is no misfortune. I welcome whatever comes; I go out gladly to meet it." Cover all misfortune, too, with this master prayer: "O God, whatever befall, spare me that supreme calamity—let no after-bitterness settle down with me. Misfortune is not mine until that hour." Here, too, is the triumph of the unconquerable mind: "The earth shall yet surrender to him and the fates shall do his will who marches on, though the promised land proved to be but a mirage and the day of deliverance was canceled. The gods shall yet anoint him and the morning stars shall sing." And this the true prayer for the battlefield: "I never doubt my strength to bear whatever fate may bring, but, oh! that I may not go down before that which I bring myself."

Nuggets of pure gold like these abound in this mine of the mind which the victorious author has opened for us. To seek it out swiftly and resolve its great wealth for himself should be the glad purpose of the elect. And who are not the elect in the light of its large teaching? To claim them in spite of themselves is its crowning lesson. "It is but common to believe in him who believes in himself, but, oh! if you would do aught uncommon, believe in him who does not believe in himself—restore the faith to him."—*St. Louis Globe-Democrat, March 5.*

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